A DESCRIPTIVE ATLAS OF VISCERAL RADIOGRAMS

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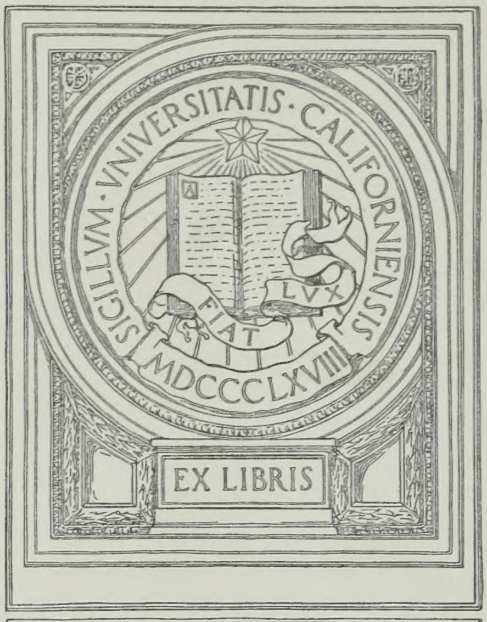

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ERRATA

Page 29 text: *for* Fig. 6 *read* Fig. 7.
„ Fig. 7 „ Fig. 8.
„ Fig. 8 „ Fig. 9.
„ Fig. 9 „ Fig. 6.

See page 5]

GASTRECTOMY

[*Frontispiece*

Mr O. A. Marxer.

Dr E. I. Spriggs.

A DESCRIPTIVE ATLAS
OF
VISCERAL RADIOGRAMS

BY

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WITH 330 ILLUSTRATIONS

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1926

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TO THOSE

FRIENDS AND CONTRIBUTORS

WHOSE KINDNESS ALONE

RENDERED THIS WORK

POSSIBLE

86206

PREFACE

We welcome this opportunity of expressing our gratitude to those who have so generously sent us the radiograms which form this Atlas.

In the alimentary part Professor Wilkie has contributed many interesting plates. In the urinary section we have derived very great benefit from Professor Fullerton, also from Mr Kidd. The respiratory section is the work of Mr Morriston Davies, Dr Johnston and Dr Spriggs. In the neurological section is described a clinical method of localising bony defects of the skull: Professor Sicard has furnished us with many beautiful examples of lipoidal injections: Dr Jordan and Mr Webb have given the dental films, and Dr Mutch several cases of aneurism. Sir William Milligan and Dr Rowden, jun., sent us the plates dealing with the nasal sinuses, and Dr Rowden and Dr Candy those of the female generative system.

Our deepest gratitude is due to Dr Rowden and Dr Spriggs for the invaluable help we derived from their clinics. Dr Rowden provided a large nucleus for the companion volume on Bones, and has done a similar service for the alimentary and urinary sections of this work. The excellence of Dr Spriggs' abdominal plates and confirmatory clinical notes shows what can be done with such treacherous subjects as the barium meal and enema when perfect understanding exists between clinician and radiographer—in this case, Mr Marxer.

No small measure of credit is due to Mr G. E. Deed, of Messrs Kimpton, for his unremitting care and attention to detail which the radiograms have required for their adequate reproduction.

To all these, and very many others, whose names space alone prevents us from mentioning, we tender our deepest thanks.

INTRODUCTION

The kindly reception given to *A Descriptive Atlas of Radiographs of the Bones and Joints* (for Students and Practitioners), written by one of us (A. P. B.), has prompted the undertaking of a companion one on the Viscera, thus completing an *Atlas of Radiograms*.

Whilst a little training will fit one for the interpretation of gross bone lesions, that of the viscera is a much more difficult problem. We have endeavoured to overcome the difficulty of obtaining a representative series by approaching surgeons and radiologists especially interested in the several branches. In our editing we have changed their phraseology only where necessary in order to give the work a uniform style.

Screen examination introduces a personal element whose value it is impossible to estimate. It is of the utmost importance to know the direction of movement of shadows and their alterations in size, and this can be done only under direct vision. The vagaries of the barium meal are such that none but the most careful screen examination can be tolerated. We have therefore included an account of such investigations in each case.

As with the previous Atlas, we have incorporated a number of normal pictures, which are on even-numbered pages, so as to be readily compared with those of the abnormal on odd-numbered pages.

Introductory notes are found on each section. They are reduced to the barest minimum, but it is hoped that they will be helpful, if read with the text.

Line drawings have been used in preference to marking the plates, which, we consider, imparts a false clearness. An inch scale is provided for each plate.

We have included many examples of the same condition where such is common or important, and have avoided rarities except when particularly instructive.

The contributors are almost all clinicians, with one notable exception. The former Atlas was intended for students and practitioners; it is hoped

that this will be of equal value to surgeons and radiologists. The whole subject is approached from the clinical aspect, and from a surgical rather than a medical viewpoint.

The original radiograms have been presented to the Royal College of Surgeons, England, and are exhibited in the museum.

4 Spital Square
and
126 Harley Street,
London.

A. P. BERTWISTLE,
and
E. W. H. SHENTON.

INTRODUCTION TO AMERICAN EDITION

These are days of reaction in many other than in the purely political and economic fields. As evidence of this fact, we hear and read expressions from a few clear-minded clinicians deploring the growing tendency in clinical medicine to multisect human anatomy and function and turn over the carefully detached portions for study, to agents more or less independent of each other.

In no branch of medicine has this separatist tendency been more marked than in the x-ray field. Patients are sent to commercial x-ray laboratories, or to the x-ray division of the hospital, where they are photographed or fluoroscoped; then a more or less full and accurate report is furnished to the attending physician or surgeon, and on this report he bases and institutes his treatment. Cooperation between the laboratorian and clinician is chiefly noticeable by its absence; and where cooperative effort ceases, there opens up the pitfall of danger for the patient.

This volume by Bertwistle and Shenton is a real accomplishment in as far as it emphasizes the indissoluble relationship that binds the roentgenologist to the clinician. These plates are as significant to the student of disease, as are specimens removed in the autopsy chamber for the purpose of preservation and subsequent study and correlation with diseased states in the living. They are all the more valuable because in a preponderatingly larger percentage the plates represent the confirmation of preoperative interpretation by inspection at the operating table. He who runs may read, and therefore the text, very wisely, has been limited to the point characterized by the poet as "infinite riches in a little room."

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St. Louis, 1926.

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LIST OF ILLUSTRATIONS

ALIMENTARY SYSTEM

	Gastrectomy	*Frontispiece*
FIGURE		PAGE
1.	Normal Œsophagus	24
2.	Normal Stomach—Immediate	24
3.	Normal Stomach—$\frac{1}{4}$ Hour	24
4.	Normal Stomach—$\frac{1}{2}$ Hour	24
5.	Normal Meal—$1\frac{3}{4}$ Hours	26
6.	Normal Meal—$\frac{1}{2}$ Hour	28
7.	Normal Stomach—1 Hour	28
8.	Normal Opaque Meal—$2\frac{1}{2}$ Hours	28
9.	Normal Stomach and Intestine—2 Hours	28
10.	Normal Colon	30
11.	Normal Enema	32
12.	Normal Colon	32
13.	Normal Stomach and Intestines	32
14.	Mass Peristalsis of Colon	32
15, 16.	Pharyngeal Diverticulum	35
17.	Salivary Calculus	37
18.	Foreign Body in Pharynx	37
19, 20.	Cardiospasm	37
21, 22.	Carcinoma Œsophagus—Intubation	39
23, 24.	Carcinoma Œsophagus	39
25, 26.	Malignant Œsophagus	41
27.	Dilatation Stomach	41
28.	Spasmodic Hourglass Stomach	41
29, 30.	Gastric Ulcer	43
31–34.	Gastric Ulcer	45
35.	Recurrent Gastric Ulcer	47
36.	Ulcer with Hourglass Stomach	49
37.	Gastric Ulcer	49
38.	Perigastritis Tuberculosa	49
39.	Hourglass Stomach	49
40.	Carcinoma Stomach	51
41, 42.	Carcinoma of the Cardia	53
43, 44.	Malignant Hourglass Stomach	53
45.	Carcinoma Cardia	55
46, 47.	Carcinoma Stomach	55

ALIMENTARY SYSTEM—*continued*

FIGURE		PAGE
48.	Carcinoma of Stomach	55
49.	Pyloric Carcinoma	57
50.	"Leather-Bottle" Stomach	57
51.	Carcinoma Stomach	57
52.	Pancreatic Cyst	57
53–56.	Congenital Pyloric Stenosis	59
57.	Duodenal Ulcer	61
58, 59.	Duodenal Ulcer	63
60.	Gall-Bladder	63
61.	Duodenal Ulcer	64
62, 63.	Duodenal Ulcer	65
64–67.	Gastroenterostomy	67
68, 69.	Gastroenterostomy for Duodenal Ulcer	69
70, 71.	Gastroenterostomy	69
72, 73.	Jejunal Ulcer	71
74.	Jejunal Obstruction	71
75.	Perforated Duodenal Ulcer	71
76.	Duodenal Diverticulum	73
77.	Duodenal Ileus	73
78, 79.	Gall-Stones	73
80–83.	Gall-Stones	75
84.	Biliary and Renal Calculi	77
85–88.	Gall-Bladder (Grahame Method)	79
89, 90.	Shot in Appendix	81
91, 92.	Appendicitis	81
93, 94.	Chronic Appendicitis	81
95, 96.	Appendicitis	83
97–102A.	Chronic Appendicitis	83
103–106.	Colitis	85
107.	Carcinoma Sigmoid	87
108, 109.	Carcinoma Cæcum	89
110.	Carcinoma of Sigmoid	89
111.	Carcinoma Prostate. Diverticulosis	89
112.	Malignant Transverse Colon	91
113.	Carcinoma Sigmoid	91
114.	Carcinoma Colon	91
115.	Carcinoma of Sigmoid	91
116.	Carcinoma Colon	93
117.	Carcinoma of Sigmoid	93
118.	Transposition Viscera	93
119, 120.	Diverticulitis	95
121, 122.	Diverticulosis	95

ALIMENTARY SYSTEM—*continued*

FIGURE		PAGE
123–126.	Diverticulosis	97
127.	Diaphragmatic Hernia	99
128.	Duodenal Ileus	101
129, 130.	Visceroptosis	101
131.	Gastroptosis	101

URINARY SYSTEM

132.	Normal Cystogram	104
133.	Normal Ureters and Pelvis	106
134.	Phlebolith	108
135.	Normal Pyelogram	108
136, 137.	Calcified Glands	108
138.	Remains of Opaque Meal	110
139, 140.	Phlebolith	110
141.	Coin in Sigmoid	110
142.	Renal Calculus	113
143.	Renal Calculus	115
144.	Renal Calculus and Sand	115
145, 146.	Renal Calculi	115
147–150.	Renal Calculi	117
151.	Bilateral Renal Calculi	119
152.	Renal Calculus	119
153.	Tuberculous Kidney	119
154–157.	Hydronephroses	121
158.	Movable Kidney	123
159.	Double Kidney	123
160.	Congenital Cystic Kidney	123
161.	Hydronephrosis	123
162–165.	Movable Kidney	125
166.	Tuberculous Kidney	127
167.	Uretral Calculus	129
168–171.	Uretral Calculi	131
172.	Vesical Calculus	133
173–176.	Vesical Calculi	135
177.	Carcinoma Bladder	137
178.	Prostatic and Urethral Calculi.	139
179.	Vesical Pouches	141
180.	Foreign Body in Bladder	143
181.	Pin in Prostate	143
182.	Urethral Calculus	143
183.	Penile Calculus	143

RESPIRATORY SYSTEM

FIGURE		PAGE
184.	Normal Chest (Age 15)	146
185.	Normal Chest (Age 30)	146
186.	Normal Chest	148
187.	Normal Chest (Age 22)	150
188.	Active Tuberculosis	153
189.	Arrested Tuberculosis	155
190.	Pleural Effusion	157
191.	Pyo-pneumothorax	157
192.	Pneumothorax, Partial	157
193	Artificial Pneumothorax	157
194.	Recurrent Tuberculosis	159
195.	Advanced Tuberculosis	159
196.	Natural Pneumothorax	159
197.	Pleural Effusion	159
198.	Lobar Bronchiectasis	161
199.	Bronchiectasis	161
200.	Acute Pneumonia	163
201.	Empyema—Old	163
202–204.	Pneumothorax	165
205.	Pulmonary Spirochætosis Castellani	165
206–211.	Artificial Pneumothorax	167
212–215.	Thoracoplasty	169
216.	Dextracardia	171
217.	Foreign Body Bronchus	171
218.	Sarcoma following Phthisis	171
219	Carcinoma Lung	171
220.	Mediastinal Lymphadenoma	173
221.	Lymphadenoma	173
222.	Carcinoma Lung	175
223, 224.	Carcinoma Lung	177
225.	Sarcoma Lung	177
226.	Dermoid Cyst of Chest	177
227.	Hydatid of Lung	179

NERVOUS SYSTEM

228–231.	Preparation of the Key Radiogram	182
232.	Key Radiogram	184
233–235.	Gyrometer	186
236.	Superimposition, Defects	186
237, 238.	Jacksonian Epilepsy	189
239–241.	Normal Theca—A.P., Lat. and P.	191

NERVOUS SYSTEM—*continued*

FIGURE		PAGE
242–248.	Spinal Tumour	191
249, 250.	Meningitis—A.P. and Lat.	193
251.	Lipoidal Ascending	193
252, 253.	Tuberculous Abscess	193
254.	Sciatica	193
255–257.	Ventriculograms	195
258, 259.	Lumbar Spina Bifida	197
260.	Cervical Spina Bifida	197
261.	Encephalocele	197

VASCULAR SYSTEM

262.	Aneurism—Heart	201
263.	Aneurism—Aorta	201
264.	Aneurism of Descending Aorta	203
265.	Aneurism—Aorta	203
266.	Aneurism of Transverse Aorta	203
267.	Aneurism	203
268, 269.	Calcification of Arteries	205
270.	Rupture of Sclerosed Artery	205

DENTAL SYSTEM

271–275.	Normal Teeth	208
276–280.	Pyorrhœa Alveolaris	211
281.	Abscess Root	211
282–284.	Bridge Work	211
285.	Abscess Root	213
286.	Crown Work	213
287–289.	Retained Roots	213
290, 291.	Unerupted Tooth	213
291A.	Unerupted Wisdom Tooth	213
291B.	Dentigerous Cyst	215

FOREIGN BODIES

292.	Halfpenny in Œsophagus	219
293.	Shot in Forearm	219
294, 295.	Needle in Thumb	219
296, 297.	Needle in Finger	219

THYROID SYSTEM

FIGURE		PAGE
298.	Branchial Sinus	223
299.	Thyroglossal Sinus	223
300.	Branchial Sinus	225
301.	Thyroglossal Sinus	225
302, 303.	Thyroglossal Cyst	225
304.	Substernal Goitre	227
305.	Adenoma Thyroid	227

NASAL SYSTEM

306.	Normal Frontal Sinus	230
307.	Normal Antrum	230
308.	Normal Antra	230
309.	Normal Sphenoidal Sinus	230
310.	Frontal Sinusitis	233
311.	Left Frontal Sinusitis	233
312, 313.	Antrum (Suppuration)	233
314.	Ethmoidal Sinusitis	235
315.	Antrum (Suppuration)	235
316.	Sarcoma of Maxilla	235
317.	Tumour of Left Orbit	235

MISCELLANEOUS

318.	Nævus of Chest	239
319.	Pharyngeal Diverticulum	239

FEMALE GENERATIVE SYSTEM

320.	Fibromyoma of Uterus	243
321.	Calcified Fibroid of Uterus	243
322.	Ovarian Cyst	243
323.	Fœtus *in Utero*—7½ months	243
324.	Fœtus *in Utero*—8 months	245
325.	Fœtus *in Utero*	245
326, 327.	Ovarian Pregnancy	245

ALIMENTARY SYSTEM

SALIVARY GLANDS

Calculus causes intermittent swelling if impacted in the duct or a stony hardness if in the gland proper. Having the same composition as tartar, it casts a dense shadow. Its diagnosis from malignant or tuberculous disease may sometimes be made only by X-rays.

PHARYNX

1. Foreign bodies are often lodged here, when dysphagia and dyspnœa ensue.

2. **Diverticulum** (often termed œsophageal) originates behind, between the transverse and descending fibres of the inferior constrictor muscles, and then passes to the left side. Gradually it comes more and more into line with the œsophagus, until all food enters it, and the pressure exerted between sternum and vertebræ causes occlusion of the œsophagus, when rapid wasting ensues. It occurs between the ages of 40 and 60. A sudden gush of putrid, undigested food, some time after a meal has been eaten, is almost pathognomonic.

The opaque meal shows a pouch with a regular rounded lower margin, and either a stalk or a rough horizontal border above.

ŒSOPHAGUS

The affections of this tube are almost always at the sites of narrowing —*i.e.* the commencement, the point of crossing of the left bronchus or the diaphragmatic opening.

1. Foreign bodies, such as dentures, halfpennies, whistles, buttons, etc., cause symptoms either at the time or later from cicatrisation, such as is also produced by corrosives.

X-rays may reveal the foreign body or, after an opaque meal, a stricture.

2. **Cardiospasm** (or, better, œsophageospasm) is a contracture of the lower end of the œsophagus, coming on between the ages of 20 and 35.

There is gradually increasing difficulty in swallowing, and vomiting of undigested food.

X-rays show a stricture at the level of the diaphragm, the opaque column is rounded below, save perhaps for a terminal spike. Above, the tube is greatly distended.

3. **Carcinoma** is to be suspected when a man past 50 complains of increasing difficulty in swallowing, the regurgitation of food unmixed with bile, and rapid wasting.

X-rays reveal the typical appearance of a tapering column, with eaten-out edges, ending in a fine point, beyond which little, if any, barium is seen.

STOMACH

1. Foreign bodies may lodge here.

2. **Chronic Gastric Ulcer** occurs oftenest on the lesser curvature in middle-aged subjects—more usually females—who are always ailing. They suffer from dyspepsia, and have furred, soft tongues. The pain comes on half to two hours after food, is aggravated by more food, but relieved by vomiting. Periodic intervals of weeks or months of comparative freedom alternate with similar periods of distress. There may be hæmatemesis or melæna. It is demonstrated radiographically by the following characteristics :—

(i) A bay of barium appearing on the upper border of the stomach.
(ii) A fleck of barium remaining after the rest has passed on.
(A fleck is the result of the stomach failing to expel the contents of an ulcer owing to the absence or fixation of muscle in its floor—it is particularly well marked when the ulcer is adherent.)
(iii) By any of its complications.
(iv) Tenderness over a site of irregularity.

The complications are :

(*a*) **Spasm,** which may be excited at the site of the ulcer, or at the pylorus. In either case it causes pain, which comes on half-an-hour to two hours after food, is aggravated by more food, and relieved by vomiting, more particularly so if the spasm is at the pylorus.

Radiographically, in the first case the greater curvature is drawn up towards the lesser, so as to give it a bilocular appearance. Though persisting some time, repeated examinations will show its occasional absence, thus disproving its organic nature.

In the second case the stomach fails to empty in the allotted time. Such may also be set up by appendicitis, gall-stones or duodenal ulcer.

(*b*) Penetration of an ulcer into surrounding solid viscera renders the previous intermittent pain constant, and to appear in the back.

X-rays show an ulcer crater with fine streaks radiating from it, the crater is particularly well seen.

(*c*) Perforation into hollow viscera, usually gastrocolic fistula, causes the characteristic *Diarrhœa lienterica*, the stools containing unaltered food.

(*d*) **Stenosis** may occur anywhere, but is commonest in the pyloric canal, the narrowest part of the organ. If in the canal, there is typical copious projectile vomiting occurring at two or three days' intervals. Great pain, loss of weight and thirst are present; atrophic gastritis affects the rest of the organ.

X-rays show abnormal peristalsis and hyperperistalsis at the emptying stages, whether such is retarded or not.

(*e*) **Hourglass** contraction is found usually in females. The greater curvature is approximated to the lesser until a fine probe will not pass the constriction. There is great pain; vomiting may be characteristic, in that some hours after an ordinary vomit follows one of putrid material from the distal loculus.

X-rays clinch the diagnosis by revealing a permanent contraction.

(*f*) Malignant disease is characterised by a transition of symptoms of ulcer to those of carcinoma.

3. **Gastric Carcinoma.**—This may occur primarily as an ulcer, a fungating mass or a diffuse carcinomatosis, or as the result of malignant change of a simple ulcer. Symptoms are sometimes typical in the early stages; they may start abruptly upon an indiscretion in diet, but usually the onset is insidious and gradual. They consist of loss of interest in life generally, loss of appetite and anæmia in a previously healthy subject. Vomiting, pain and hæmatemesis are to be regarded more as frequent complications, a tumour as an indication for urgent operation, and cachexia a sign of hopelessness.

X-rays often give an early diagnosis as follows :—

(i) The arrest of the peristaltic wave on one border whilst it passes on along the other is very typical.

(ii) A small stomach with obstruction in a man over 40 of previous good health is diagnostic.

(iii) A small undilatable, tubular stomach is indicative of carcinomatosis, and is styled "Leather-bottle."

(iv) A filling defect is sometimes found in the cardia or body of the organ.

(v) Large irregular ulcers are often malignant.

4. **Congenital Pyloric Stenosis** occurs usually in first-born males, one to ten weeks after birth. At first food is taken normally, then vomiting begins. His food is changed, with temporary cessation, but vomiting recurs. It is profuse and projectile. Rapid wasting ensues. An epigastric tumour of a transitory nature is to be felt, if repeated examinations are made. Peristalsis is visible through the abdominal wall.

X-rays show arrest of food for long periods—in fact, until vomited, none entering the duodenum in advanced cases.

DUODENUM

1. **Duodenal Ulcer,** unlike gastric ulcer, is much easier to diagnose clinically than radiologically, its clinical symptoms being very definite. There is the well-known sequence—" Food—Pain—Food—Relief "—in a male (usually) 20 to 40 years of age. The subjects are healthy active men with clean firm tongues. The symptoms are markedly periodic, intermissions of anything up to six months, in which the patient is in perfect health, being the rule. Attacks of faintness followed by a dark stool twelve hours later are sometimes experienced. The patient is afraid to eat because of the pain which inevitably follows. It comes on one to two hours after food, and frequently wakes the patient, when a biscuit kept at the bedside will dispel it, thus earning the name " hunger pain." Radiographically there may be :

(i) Deformation of the duodenal cap. This must not be confused with effects of the gall-bladder.

(ii) Fixed niche usually seen on the under surface of the junction of the first and second parts.

(iii) Fleck of barium remaining after the rest of the meal has passed (see Fig. 57).

(iv) A combination of gastric retention with hyperperistalsis in a large but otherwise normal stomach.

2. **Diverticulum,** which can be diagnosed only by X-rays, is found at the junction of the embryonic fore and mid guts—*i.e.* the origin of the second part of the duodenum.

3. **Duodenal Ileus** is a condition of dilatation set up by the superior mesenteric vessels pressing on the third part of the duodenum.

X-rays show the organ streaked with barium and dilated with gas.

STOMACH OPERATIONS

1. **Gastroenterostomy.**

Radiographic points to be observed are :

(i) Patency of anastomosis.
(ii) Patency of pylorus.
(iii) Rate of emptying.
(iv) Tenderness over the site.

2. **Gastrectomy.**

The jejunum, recognised by its valvulæ conniventes, is tacked on to the stomach.

3. **Jejunal Ulcer.**

(i) A pouch appears at the site of the junction.
(ii) A fleck remains above the colon, below the stomach.
(iii) Tenderness over the anastomosis.

GALL-BLADDER

1. Calculi vary in composition and characteristics :

(i) Cholesterin, if pure, is a single, greenish yellow, waxy, pearl-like body, not opaque to X-rays unless coated with a layer of calcium salts.
(ii) Pigment stones are soft, cinder-like and multiple—they are not opaque.
(iii) Mixed are much the commonest ; they are multiple, faceted and contain calcium, the amount present being in direct relation to their opacity, 80 per cent. being invisible under present methods of examination.

Subjects are oftenest middle-aged obese females.

The symptoms caused depend on their situation. In the gall-bladder they cause " flatulent dyspepsia " : discomfort rather than pain is complained of. In the cystic duct attacks of colic occur—viz. sharp pain in

the epigastrium, shooting to the right scapula—intense tenderness over the gall-bladder, and pyrexia. In the common duct there is similar colic, followed in twenty-four hours by jaundice and clayey stools. When impacted in the small intestine, obstruction ensues.

Radiological Evidence of Pathological Gall-Bladder
(L. A. Rowden)

A. Direct evidence:
   1. Shadows of stones: (*a*) opaque and solid.
      (*b*) new moon.
      (*c*) wedding-ring.
      (*d*) mosaic, due to overlapping.
   2. Shadow of gall-bladder.
      Every clearly visible gall-bladder is pathological.

B. Indirect evidence:
   1. Pressure effects on (*a*) duodenum.
      (*b*) pyloric end of stomach, half shadow.
   2. Traction effects: (*a*) pouching of duodenum.
      (*b*) displacement of duodenum.
      (*c*) displacement of colon.
      (*d*) adhesions of duodenum and colon.

APPENDIX

Foreign bodies, particularly shot, from eating game, may lie latent here for some time.

Repeated X-ray examinations are necessary to see whether they are expelled; if not, operation is indicated.

As the organ readily fills with barium and is often visible it is available for inspection.

The indications of disease are:

(i) Spasm, which is manifested as a sharp interruption in the continuity of the barium.

(ii) Concretions causing mottling, as they prevent the barium filling the organ uniformly.

(iii) Adhesions and kinks.

(iv) Tenderness over the organ.

CÆCUM, COLON AND RECTUM

1. **Colitis** is characterised by copious, frequent, loose stools.
X-rays reveal :

(i) Loss of haustration—*i.e.* segmentation.
(ii) Rapid movement of opaque meal, so that films taken at a second's interval show great changes in pattern.
(iii) Lengths of the colon to contain only traces of meal, whilst others contain the normal quantity.

2. **Diverticulosis** consists of the studding of the colon with innumerable pouches, which are commonest in the sigmoid and less numerous proximally. They cause no symptoms, save perhaps wind, unless inflamed, when (i) perforation and subsequent peritonitis ensues; (ii) fistulous tracts form, especially into the bladder; (iii) diffuse inflammation occurs, giving rise to symptoms and signs simulating carcinoma.

An opaque enema shows buds projecting from the colon; such may remain filled for days or weeks, when they appear as pear-shaped bodies, the stalk corresponding to their attachment. In inflammation these rounded pouches become a series of spikes, the bowel intervening being hyperperistaltic.

3. Malignant disease is of frequent occurrence, being commonest in the sigmoid. On the right side a fungating mass is most frequent, whilst on the left the annular variety predominates. In the former case a palpable tumour may be the first indication. Diarrhœa is common, the ascending colon normally absorbing the majority of the water. In the latter case acute intestinal obstruction may be the first sign, though usually there is a history of diarrhœa, alternating with obstruction, in a man previously regular. The diarrhœa is the result of putrefaction of the pent-up fæces; it may occur first thing in the morning only. Melæna is frequent.

Radiographically disease is manifested :

(i) By a filling defect.
(ii) Loss of haustration.
(iii) Interruption in the opaque enema.
(iv) Arrest of enema or meal at one point, with proximal dilatation.

DIAPHRAGMATIC HERNIA

Is the result of a trauma or rare developmental error, in which abdominal viscera, especially the stomach, enter the thorax behind the primitive septum transversum.

It is diagnosed with accuracy only by X-rays.

VISCEROPTOSIS

Is a condition in which the tone of the abdominal muscles is decreased, allowing the mesenteries to become stretched, with all the symptoms of irritation of the splanchnic nerves.

X-rays show the sagging which occurs. It must be remembered that most of the viscera lie lower than are depicted in text-books, especially when laden with barium. Festooning of the transverse colon with normally situated flexures is not abnormal.

URINARY SYSTEM

CYSTOGRAM

An opaque solution, such as $12\frac{1}{2}$ per cent. sodium iodide in 1 in 3000 mercuric biniodide solution, is injected into the bladder, which is then radiographed.

Diverticula and filling defects—due to growth projecting into the lumen—are the chief pathological findings.

PYELOGRAM

A similar solution to that for the cystogram is passed into the renal pelvis by means of a ureteric catheter, under slight pressure. Points to be observed :

(i) Increase of content over 5 cc. signifies hydronephrosis.
(ii) Filling defects.
(iii) Deformations caused by bands, abnormal vessels, etc.
(iv) Destruction of the pyramids.

URINARY CALCULI

These are composed of one or more of the following :—

(i) Uric acid ; unless when mixed these are small, reddish brown, and form an ideal nucleus for the deposition of other salts. They occur in subjects of the uric-acid diathesis. These calculi are not opaque to X-rays.

(ii) Oxalate of calcium forms a very hard brittle calculus, similar in shape to a raspberry. They occur as the result of excessive intake of oxalates, or from faulty metabolism in certain dyspeptics. They are very dense to X-rays.

(iii) Phosphates occur in those people who habitually pass quantities of phosphate crystals or as the result of infection and subsequent urinary decomposition. Uric acid or calcium oxalate frequently forms the nidus round which they collect. If old they are laminated, each layer representing an attack of cystitis, so that

theoretically it should be possible to tell the number of attacks, just as it is the age of a tree by the rings on its cross section. They are friable. Phosphates cast a tolerably dense shadow.

(iv) Cystine calculi are found in those subjects of inborn errors in metabolism in which the patient is unable to utilise cystine.

(v) Xanthin and dyes have been recorded.

1. **Renal Calculi.**—These are found either in the renal parenchyma or the pelvis. When in the former situation symptoms may be absent, or there is a dull ache in the loin until they find their way into the renal pelvis. In the pelvis, renal colic occurs. There is acute pain in the loin and along the course of the ilioinguinal and hypogastric nerves, vomiting, scanty highly coloured urine and great constitutional disturbance. On the stone slipping backwards into the pelvis or forwards into the bladder symptoms cease as suddenly as they began. The cause of the pain is probably distension of the renal pelvis.

A renal stone has the following characteristics under X-rays :—

(i) The shadow is in the renal area—*i.e.* the angle subtended by the vertebræ and last rib—except when the kidney is displaced.

(ii) The shadow has sharply cut margins and a uniform outline, unlike calcified glands.

(iii) Its size is smaller when viewed A.P. than P.A.

(iv) Movement commences with respiration, and cannot be restrained by the hand.

(v) It moves downwards and outwards.

(vi) If multiple, the relations of the shadows are unaffected by a movement of the kidney.

(vii) If pelvic, it is often nose-shaped, and may even form a complete cast of the pelvis and calyces, such being quite pathognomonic.

Differential diagnosis includes gall-stones, calcified glands and tips of transverse processes and intestinal contents.

2. **Ureteric Calculi.**—These originate in the kidney, increasing in size by accretion in the ureter until they become "datestone"-shaped. They are usually found lodged in the narrowest parts of the ureter—viz. the commencement, the point where the ureter crosses the brim of the pelvis and the vesical orifice.

X-ray characteristics are that they lie in the line of the ureter—*i.e.* along the tips of the transverse processes, the sacroiliac synchondrosis and the ischial spine. In the pelvis a ureteric catheter may be necessary to distinguish them from phleboliths. Differential diagnosis is from phleboliths and intestinal contents, also encysted vesical calculus.

3. **Vesical Calculus.**—This originates in the kidney most often, though any foreign body in the bladder serves as a nucleus. Such bodies are legion in variety, including hairpins, match stalks, pins and—it is rumoured—a small bust of Napoleon. Catgut sutures in the presence of cystitis readily become coated with phosphates.

Symptoms include hæmaturia and excruciating pain referred to the tip of the penis, both of which occur at the end of micturition, as the bladder contracts down on to the stone. Frequency is an indication that cystitis is present. Sudden stoppage may occur as the stone enters the urethra. A cystoscope readily reveals it.

Under X-rays the stone is seen immediately above the symphysis when the bladder is empty, but some distance away if full and the patient is lying down. The calculus has to be diagnosed from foreign bodies and concretions in the rectum.

4. **Prostatic Calculi.**—These originate in the corpora amylacea, when they are multiple-spiked bodies, from calcification of gonococcal and tuberculous abscesses or from the kidney. A metal catheter may detect grating.

Under the rays they are seen behind and just above the symphysis.

5. **Urethral Calculi** are always derived from kidney or bladder, and become arrested in the membranous portion or the fossa navicularis.

DISEASES OF THE KIDNEY

1. **Hydronephrosis.**—This is caused by intermittent blockage of the ureter or pelvis, either by calculus—when the kidney substance suffers—or by bands, kinks, abnormal arteries or straits in the ureter—when the whole pelvis dilates.

X-rays show :

(i) Enlargement of the renal shadow.
(ii) Calculi, if present, lying outside the renal area whilst some of the kidney occupies this space.
(iii) Pyelograms give a definite diagnosis, a capacity of 5 cc. or over being pathological.
(iv) Flattening of the pyramids as shown by a pyelogram is very characteristic.

2. **Movable Kidney.**—Found oftenest in multiparæ, it may cause no symptoms save neurasthenia. If the ureter becomes blocked, Dietl's crises ensue : sharp agonising pain, meteorism and strangury ; when the

crisis terminates sudden relief is followed by passage of large quantities of pale urine of low specific gravity.

3. **Tuberculous Kidney.** At the onset this is unilateral. It causes occasional hæmaturia, pyuria usually, bacilluria and frequency. The cystoscope usually reveals characteristic changes at the uretral orifice.

X-rays may detect pus—when the whole organ is enlarged and hazy—or calcified areas. A pyelogram shows erosion of the pyramids. Tuberculosis must be diagnosed from calculous disease.

BLADDER

1. **Carcinoma.**—Characterised by pain, frequency and persistent slight hæmorrhage in a man usually over 40. It may be palpable per rectum as a hard mass above the prostate.

A filling defect may be seen in a cystogram ; if the sphincter has been destroyed, injection may enter the ureter.

2. **Diverticulum.**—This may be single or multiple, often associated with back pressure.

If cystograms be taken at various stages of emptying of the bladder the pouch or pouches will be seen ; finally, when all possible has been voided, a dark shadow remains outside the vesical area.

RESPIRATORY SYSTEM

LUNGS

DISEASE is shown by an increase or decrease in opacity. This may be due to diminution of air or actual replacement of lung by a more opaque tissue. It is also suggestive when the diaphragm fails to move freely on screen examination. Alterations in the bronchial tree are also of importance. The following are indications of disease :—

1. **Increased Density :**
   - A. *General.* (i) Pneumonia of the lobar type causes an increased opacity, due to diminished air capacity of the lobe affected.
     (ii) Sarcomatosis or carcinomatosis gives rise to massive consolidation.
     (iii) Miliary tubercle results in a diffuse mottling of the whole lung.
   - B. *Local.* (i) Broncho pneumonia causes mottling and alterations in the bronchial tree.
     (ii) Tuberculosis casts shadows by virtue of its replacement of air, in the early stages; later by calcification of caseous nodules.
     (iii) Carcinoma—often secondary to breast—produces opacity.
     (iv) Sarcoma—primary, or secondary to that of bones—or melanoma produces opacities, often multiple. Osseous metastasis are early, hence the need for screening the chest whilst contemplating extensive operation.

2. **Decreased Density :**
   - A. *General.* (i) Emphysema.
   - B. *Local.* (ii) Cavitation from tuberculous disease.

PLEURA

Lesions are manifested by variations in opacity and displacements of the heart shadow.

1. **Increased Opacity :**
   - A. *General.* (i) Pleural effusions result in increased density, the heart is displaced, the cupola of the diaphragm shows decreased movement, and the angle it makes with the chest wall is increased. It must be diagnosed from subphrenic abscess, which causes irregular elevation, fixity and no alteration in heart shadow.
     (ii) Thickened pleura.
   - B. *Local.* Empyema displaces air and lung and so casts a shadow. If injected with bismuth its extent is strikingly demonstrated.

2. **Decreased Opacity :**
   - A. *General.* Complete pneumothorax, natural or artificial, renders the affected side translucent; the collapsed lung is seen at the hilum.
   - B. *Local.* Where pneumothorax is incomplete, from adhesions or failure of the lung to collapse, an area of clearness is seen next to the chest, and at a varying distance from the hilum the lung is seen. Bands may be visible—such have been divided actually under X-rays.

MEDIASTINUM

Shadows are cast by enlargements of any of the constituent parts if they encroach on the lungs; such are :

(i) Lymphatic glands : these may enlarge with Hodgkin's or tubercle disease, and from new growths, primary or secondary.
(ii) Substernal thyroid : especially if there is increase in size.
(iii) Aneurysms of the great vessels are indicated by their position and pulsation.
(iv) Increase in size of heart.
(v) Pericarditis with effusion.

NERVOUS SYSTEM

CLINICAL CEREBRAL TOPOGRAPHY (A.P.B.)

If the focal areas of the human brain are to be mapped out with anything like the accuracy which has been attained in the lower animals it is necessary to have some simple method of ascertaining the part of the brain underlying a cranial deficiency. Much work has been done on cats, dogs and apes, but the number of clinical cases in which the symptoms have been recorded and defects mapped out is surprisingly small.

The number of methods which have been devised suggests that the desirable simplicity has not been attained. In Chiene's method certain bony landmarks have been chosen, and lines joining these and parallel to them have been used to determine the relationship of the cerebrum to the surface of the head. Reid uses arbitrary lines, distances along and at right angles to them are measured. Head [1] has adopted an accurate but laborious process, which will be detailed below. The writer [2] has published a method of correlating the cerebral sulci to the skull.

In 1904 Berry and Shepherd [3] wrote an excellent account of the relative accuracy of the three best-known methods used in cranio-cerebral topography, which included the following :—

1. *Hare and Thane :*

The fissure of Rolando was found to be accurately marked out by a line drawn downwards and forwards at an angle of $67\frac{1}{2}^{\circ}$ from a point $\frac{1}{2}$ in. behind the mid-point of the median nasion-inion line (*Hare*). (Pierce Gould and Cunningham attribute this method to Chiene.) The Sylvian point was correctly located in 70 per cent. of cases $1\frac{1}{2}$ in. behind and $\frac{1}{4}$ in. above the level of the external angular process. The Sylvian line was rarely found to correspond to the line drawn from the Sylvian point to a point $\frac{1}{2}$ in. below the parietal eminence.

The conclusion was that, with the exception of the Sylvian line, this method was "sufficiently accurate to justify its employment by surgeons."

2. *Chiene :*

The conclusions were :

"In view of the error as regards using the glabella, the undoubted complexity of the method and the large amount of error as regards the Rolandic area, we do not feel that one result would justify us in recommending this method for practical purposes, notwithstanding it is good for the Sylvian point and more accurate than Hare and Thane's method as regards the Sylvian fissure."

3. *Reid :*

The results were as follows :—

"The superior Rolandic point was altogether wrong in 66 per cent. and the fissure of Rolando in an equal number. The fissure of Sylvius was altogether inaccurate in every instance, as, not only was the fissure incorrectly determined, but the direction was bad, the error of too great

obliquity being even more marked with this method than with either of the others. It was excellent for the fissure of Rolando in dolicocephalic skulls, but altogether inaccurate for brachycephalic ones."

4. *Kronlein* uses parallel, vertical and intersecting lines.

The most obvious practical disadvantage of all these methods is that they require the head to be shaved. Whilst this is a necessary pre-operative measure there would be marked personal objection to doing it after operation, when the hair had grown.

Head has devised the following method of locating a cerebral injury :

"The distance from the root of the nose to the external occipital protuberance along the middle of the scalp was recorded in cases, and the point determined at which it was cut by the interaural line. Then the position of the wound was mapped out, its diameters measured and the distance of its various parts determined in relation to the nasion-inion line and the middle of the scalp. . . . The head of a male body was selected which corresponded as nearly as possible in its measurement with that of the patient whose wound we intended to localise. The exact extent of the loss of bone was marked out on the scalp and holes were drilled through the skull to mark its dimensions. Through these a coloured fluid was passed with a small brush, to fix the relation of the bony opening to the surface of the brain. Then the skull cap was removed and a cast taken of its inner surface. This gave us a solid reproduction of the brain covered by its membranes, on which were indicated the limits of the external wound. The situation and course of the principal fissures was determined by careful dissection and drawn in the cast. Thus we finally obtained a record of the area occupied by the wound on the surface of the brain in relation to the main landmarks of cerebral topography."

The method is accurate provided always that it is possible to obtain a sufficient choice of subjects to enable one to match the patient's head. The main lines are over the most hairy parts of the scalp, and therefore difficult of fixation.

The method to be described entails the use of :

(*a*) A Base-line.

(*b*) A Radiograph showing the relation of the cerebral convolutions to the head.

(*c*) Two mechanical devices—namely, a watchspring scale and the gyrometer.

BASE-LINE

The line chosen is an almost horizontal one, running from the glabella to the external occipital protuberance and passing just above the point where the pinna joins the scalp. Whilst its origin and termination are not ideal, it possesses the unique advantage of being available for both clinical and radiological purposes. The line is much more readily fixed than a sagittal one, which would be quite unsuitable here, as it would be calibrated from the periphery, where the inches are least dependable. It is of importance that three-quarters of it in males is hairless, and they furnish the majority of depressed fractures. With the exception of the occipital pole, the rays are centred on the most important functional parts of the cortex. Should any shrinkage occur in the cadaver's brain it is minimal at the centre of this line. A small advantage is that ear cones may be dispensed with, the line of rivets serving to determine whether the radiograph is a pure lateral one or not.

The accuracy of the method was tested as follows on cadaver. First, a number of match stalks were sharpened and dyed. Six important gyri were chosen —viz. Pars Triangularis, lower part and junction of lower third and upper two-thirds of pre-Rolandic gyrus, Superior Temporal, Marginal and Angular gyri (Fig. 234). The gyrometer having been placed in position on the cadaver's head the constants for breadth and length were determined (see p. 187). The heights of each of these gyri and the distances at which their perpendiculars cut the base-line were corrected by multiplying by the constants. At these points the skull was drilled with a gimlet and a coloured match stalk inserted until it entered the brain, and the process was repeated on the other side. The brain was removed with the matches *in situ* and each was identified. Thus in one case the circumference of the head was 24 in., so that in this case the constant for length was $\frac{24}{22{\cdot}5}=1{\cdot}075$, or practically 1·1. The angular gyrus on the key is 2·8 in. behind the central point and 2·5 inches above the base-line. Before transferring the former figure to the patient's head it was multiplied by the horizontal constant 1·1 in., which gave the corrected figure nearly 3·1 in. —a difference of a quarter of an inch. The vertical constant was $\frac{11{\cdot}5}{11}-1{\cdot}05$ at this point, a figure which is almost negligible, so that the latter measurement (2·5) was transferred direct to the patient.

In no case was the discrepancy more than $\frac{1}{4}$ in.; this could easily be accounted for by the variation in pattern of the convolution. The circumference of the heads investigated were 24 in. and $22\frac{1}{2}$ in., whilst their breadths along the central upright were $11\frac{1}{2}$ in. and 11 in. respectively.

With a long series of cases it will be possible to extend, confirm or, possibly, revise our knowledge of the human cortex. The size of a single craniectomy militates against accurate localisation, but the difficulty can be overcome by superimposing several cases. Thus, if three cases have identical symptoms, and their cranial gaps A, B and C overlap at D, this area will be over the part responsible for the symptoms manifested (Fig. 232).

TUMOURS

If the position of a lesion in the brain is known by the symptoms the method will enable one to determine fairly accurately the point on the head under which it lies. For example, take a case of aphasia which has been localised to the angular gyrus. Measure the height of this gyrus above the base-line and the distance behind the central point at which this vertical cuts the base-line. Now place the gyrometer in position on the patient's head and slide the curser into position, and at the required distance above the base-line scratch the scalp. This scratch-mark will form the centre of the subsequent craniectomy. In view of the uncertainty which must always exist in the accurate localisation of brain tumours it will not be necessary to correct for length and breadth of head, except in children and patients with unusual-shaped heads.*

* By the kindness of Professor Elliot Smith, Dr Harris and Mr Melville, for all of whose assistance I am extremely grateful, I was permitted to work out the details of the relation of the sulci to the head by means of the X-rays in the Anatomical Department of University College, London. With Dr Woodyatt's kind help I was able to test the accuracy on several cadavers. I wish to thank Miss Edith M. Wood, Ipswich, for Figs. 228, 231, 233, 234 and 235.

SUMMARY

1. A method is suggested by which points on the cerebral cortex can be localised to the surface of the unshaven head.

2. Cranial defects are measured along, and at right angles to, a line passing horizontally from the glabella to the external occipital protuberance.

3. It is applicable to patients of all ages, because it allows for variations in circumference and breadth of heads.

4. It will be found most useful in investigation of lesions over the following clinical areas :—

(i) Pre- and post-Rolandic gyri.
(ii) Opercula of Island of Reil.
(iii) Superior Temporal convolution.
(iv) Supramarginal and Angular gyri.

5. When mapped out for tumours, the key will enable one to trephine more nearly over the centre of the tumour.

VENTRICULOGRAM

The principle involved is the replacement of a certain amount of cerebrospinal fluid by air. By moving the head different ways the air can be made to travel into the several parts of the ventricular system; if the foramina are patent a normal brain shows a diffuse mottling as the result of air escaping into the subdural space. Any obstruction to the fluid escaping into the subdural space results in a translucent area appearing, a result of pent-up air.

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[2] A. P. Bertwistle: (a) *Brit. Jour. Surg.*, July 1923, p. 73, "A Depressed Fracture over the Angular Gyrus, Clinical and Radiological Localisation"; (b) *A Descriptive Atlas of Radiographs of the Bones and Joints*, pp. 14 and 46 (J. Wright & Sons, Bristol).

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VASCULAR SYSTEM

HEART

Cardiac enlargement, or distension of the pericardium with fluid or pus, causes an increase in the heart shadow to the left, and somewhat to the right of the sternum. Foreign bodies if embedded in the heart muscle oscillate widely with each beat.

ARTERIES

Aneurysms of the large vessels are manifested by increase in the mediastinal shadow. Erosion of vertebræ may be seen. Occasionally systemic aneurysms are visible as the result of calcification—or even plaques of bone—developing in their walls. Steel wire and needles introduced for curative purposes are well seen.

NASAL SYSTEM

Disease is evidenced radiographically by one of the following features :—

1. Decreased radiolucency.
2. Presence of sequestra.
3. Disappearance of bony structure.

Pus and inflammatory fluids, by displacement of air, cause the air cells to become opaque. For some time the bones retain their definition, but later they become absorbed, when sequestra may come into evidence. Simple new growth causes expansion of the bones, whilst malignant disease causes their destruction and disappearance.

THYROID SYSTEM

The thyroid gland is liable to the development of adenomata, into which hæmorrhage often occurs; such may become calcified.

If substernal the gland gives rise to attacks of dysphagia and dyspnœa, relieved only by its elevation. It is revealed under X-rays by an increase in mediastinal shadow round about the sternoclavicular articulations.

Thyroglossal cysts may be demonstrated by the silhouette radiogram, and sinuses by injection of bismuth, and by probes.

FEMALE GENERATIVE SYSTEM

OVARIES

The ovaries are liable to dermoids: these are strictly teratomas, having representatives of all three embryonic layers in their walls; the most easily identified structures under X-rays are teeth.

UTERUS

This is prone to fibroadenomata, which are liable to hæmorrhage and subsequent calcification, when the condition is revealed by X-rays.

Enlargement of the uterus may be shown radiographically by upward displacement of the intestines.

PREGNANCY

X-rays will detect a fœtus about the sixth month; such therefore affords another conclusive sign of pregnancy.

The relative size of head and pelvic outlet is often of great value. The last case in this Atlas is an admirable example of the value of X-rays in determining position.

ALIMENTARY SYSTEM

FIGURE 1

FIGURE 2

FIGURE 3

FIGURE 4

Figure 1.—NORMAL ŒSOPHAGUS

A woman of 44.

Radiogram (Erect).—Right lateral view. Represents the filling of a normal œsophagus. The constriction in the neighbourhood of the left bronchus is well seen.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 2.—NORMAL STOMACH—IMMEDIATE

The man, aged 30, was of the thick-set type.

Radiogram (Erect).—The food is entirely in the stomach. The duodenal cap is well seen.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 3.—NORMAL STOMACH—$\frac{1}{4}$ HOUR

This is the normal appearance $\frac{1}{4}$ hour after ingestion of barium. Traces of food are visible in the duodenum and small intestine.

Dr L. A. Rowden.

Figure 4.—NORMAL STOMACH—$\frac{1}{2}$ HOUR

Half-hour after food this was the condition (same patient as Fig. 3).

Dr L. A. Rowden.

FIGURE 5

Figure 5.—NORMAL MEAL—$1\frac{3}{4}$ HOURS

A woman 37 years old.

Radiogram (Supine).—The stomach contains half the barium; the majority of the remainder is in the jejunum, the valvulæ conniventes of which are clearly visible.

Mr O. A. Marxer. Dr E. I. Spriggs.

FIGURE 6

FIGURE 7

FIGURE 8

FIGURE 9

Figure 6.—NORMAL MEAL—$\frac{1}{2}$ HOUR

A woman of 37.

Radiogram (Prone).—The majority of the barium is in the stomach; some is seen passing into the duodenum, the course of which is readily made out, and into the jejunum. The "stepped" appearance of the duodenum is not an uncommon finding.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 7.—NORMAL STOMACH—1 HOUR

A woman of 37.

Radiogram (Erect).—The cylindrical shape of the organ indicates that its musculature is holding its contents firmly. Barium is seen entering the duodenum, the valvulæ conniventes of which are clearly visible. An air space occupies the cardia.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 8.—NORMAL OPAQUE MEAL—2$\frac{1}{2}$ HOURS

Radiogram (Prone).—Whilst the stomach contains some barium, the majority has passed into the small intestine. None is present in the large gut.

N.B.—Gall-stones are visible to the right of the second lumbar vertebra.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 9.—NORMAL STOMACH AND INTESTINE—2$\frac{1}{2}$ HOURS

Radiogram.—Normal appearance of an opaque meal 2 hours after ingestion. About half the food remains in the stomach, which shows an incisura; the rest is in the ileum, scattered fragments being in duodenum and ileum. The course of the duodenum is well seen.

Dr L. A. Rowden.

FIGURE 10

Figure 10.—NORMAL COLON

A woman of 59.

Radiogram (Prone).—The colon and cæcum are well filled with buttermilk and barium enema, some of which has regurgitated into the ileum. This is not pathological. The appendix is visible between the ileum and cæcum.

Mr O. A. Marxer. Dr E. I. Spriggs.

FIGURE 11

FIGURE 12

FIGURE 13

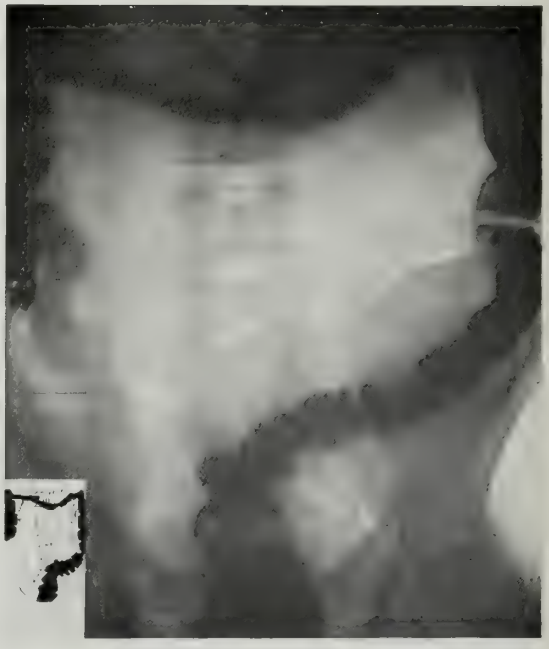


FIGURE 14

Figure 11.—NORMAL ENEMA

A woman of 35.

Radiogram.—The colon and cæcum are well filled, the latter being inverted. This abnormality is found in ½ per cent. of cases, and is not pathological.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 12.—NORMAL COLON

A woman of 47.

Radiogram (Frone).—The whole of the cæcum and colon are seen: the low position of the left part of the transverse colon is a natural anomaly. (This part of the transverse colon is superimposed on the descending colon, evidenced by the haustral segmentation being different on each side.)

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 13.—NORMAL STOMACH AND INTESTINES

Appearance 5 hours after partaking of meal.

The stomach is almost empty. The ileum, cæcum and ascending colon contain most of the meal, whilst transverse and descending colons contain fragments.

Dr L. A. Rowden.

Figure 14.—MASS PERISTALSIS OF COLON

The whole of the colon is filled with barium as the result of a peristaltic rush.

Two kinds of movement occur in the large intestine. There is the antiperistaltic movement—which is not true peristalsis, since a wave of inhibition does not precede contraction—in the cæcum and ascending colon, producing an axial stream. Secondly, there is true peristalsis, which occurs at intervals of half-an-hour or so, and which, starting in the cæcum, sweeps everything before it until the sigmoid is reached, where the fæces are stored. Such a peristaltic wave is here depicted.

Dr L. A. Rowden.

Figure 15.—PHARYNGEAL DIVERTICULUM. (See Figure 1)

Clinical History.—A man aged 58 had had some difficulty in swallowing for years. Recently it had increased, considerable quantities regurgitating half-an-hour after a meal. The patient had lost weight and felt under-nourished.

Radiogram (Oblique position).—A large shadow is seen, characteristically rounded below and irregular above.

Operation.—An incision was made in the neck and the pouch dissected out and removed. The wall of the pharynx was sewn up in two layers, drainage being instituted down to the suture-line for three days. Complete recovery ensued.

Dr W. J. S. Bythell. Sir Wm. Milligan.
Dr A. E. Barclay.

Figure 16.—PHARYNGEAL DIVERTICULUM. (See Figure 1)

Clinical History.—A man aged 75 complained of nine years' difficulty in swallowing, with curious chuckling noises in his throat and a very copious expectoration of mucus and saliva. Latterly he had great difficulty in deglutition; there was marked loss of weight.

Radiogram (Oblique view immediately after the ingestion of 4 oz. of barium suspension. Upright).—Above the clavicle and posterior to the trachea there is a globular pouch containing barium suspension. The lower end of the pouch is free; superiorly it is attached by a neck to the lower end of the pharynx, just above the level of the cricoid cartilage.

Private Clinic. Prof. D. P. D. Wilkie.

FIGURE 15

FIGURE 16

Figure 17.—SALIVARY CALCULUS

Radiogram.—A small calculus is visible in the submaxillary gland.

Dr G. F. Stebbing. Sir Charters Symonds.

Figure 18.—FOREIGN BODY IN PHARYNX

Clinical History.—A woman aged 22 was holding a safety-pin in her mouth when, suddenly taking a deep inspiration, she swallowed it. Great pain and distress followed, accompanied by slight hæmorrhage.

Radiogram.—Shows a safety-pin with its hinge down, half-way between the jaw and the clavicle.

Operation. Direct examination revealed the pin, with its point directed upwards and embedded in mucous membrane. The point was seized and thrust downwards until free of mucosa, when the pin was partially closed and insinuated into a tube. Delivery was easy and the patient recovered.

Dr A. E. Barclay. Sir Wm. Milligan.
Dr J. M. W. Morison.

Figure 19.—CARDIOSPASM. (See Figure 1)

Clinical History.—A man aged 27 had a two years' history of pain in the back and right side of his chest. After eating there was a sensation of the food lodging in the chest.

Radiogram (Right oblique). The column of barium ends in a fine point beyond which opaque streaks are seen.

Operation.—Dilatation with Plummer's œsophageal bag caused some improvement.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 20.—CARDIOSPASM. (See Figure 1)

Clinical History.—A woman of 50 began to have substernal pain and regurgitation of food some seven years ago. A year later gastrostomy was done and a tube worn for two years. A Killian tube was passed and bougies inserted up to $\frac{3}{4}$ inch in diameter without securing even a day's relief. At the time of the radiogram food caused her very severe pain at the end of the sternum, it was regurgitated three or four times during each meal.

Screen.—Barium emulsion passed freely to the stricture, beyond which it moved slowly, a large amount remaining after four hours.

Radiogram.—The œsophagus is dilated and somewhat tortuous. The lower end of the opaque column is funnel-shaped; from its termination flows a fine stream.

Operation.—The obstruction was forcibly dilated by the insertion of a Plummer's rubber bag, which was inflated subsequently with water under considerable pressure. This was repeated on three occasions in the course of a fortnight.

Result.—Immediate relief was followed by a gain of 28 lb. in five months.

X-rays then showed barium entering the stomach without hesitation, there was still dilatation, though food did not accumulate.

Dr N. Mutch.

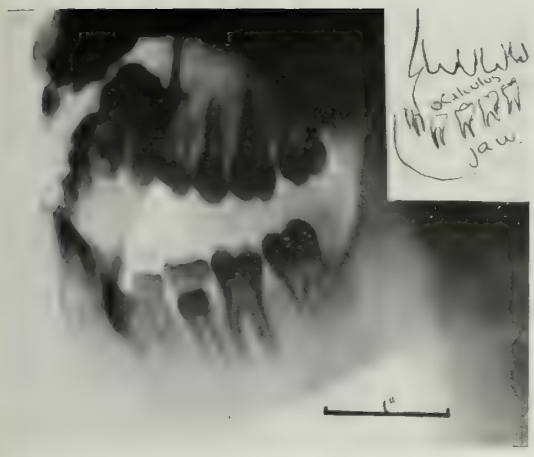


FIGURE 17

FIGURE 18

FIGURE 19

FIGURE 20

Figure 21.—CARCINOMA ŒSOPHAGUS—INTUBATION. (See Figure 1)

Radiogram.—A Symonds' tube has been passed into the œsophagus and an opaque meal given. The outline of the tube is visible, passing through the column of barium, which ends abruptly at the site of the growth.

Dr G. F. Stebbing. Sir Charters Symonds.

Figure 22. CARCINOMA ŒSOPHAGUS—INTUBATION. (See Figure 1)

Radiogram.—A Symonds' tube is seen behind the heart shadow.

Dr G. E. Stebbing. Sir Charters Symonds.

Figure 23.—CARCINOMA ŒSOPHAGUS. (See Figure 1)

Radiogram.—The meal has been arrested at a point corresponding to the crossing of the left bronchus. Above, the œsophagus is dilated and contains gas.

Remarks.—The abrupt termination, if near the cardia, would suggest cardiaspasm.

Dr W. H. Rowden.

Figure 24.—CARCINOMA OF ŒSOPHAGUS. (See Figure 1)

Clinical History.—A man of 62 gave a history of gradually increasing difficulty in swallowing, over a period of two months. The symptoms were intermittent to start with, but later became constant; only fluid nourishment could be taken at the time of examination.

Radiogram (Oblique view, upright position).—There is an elongated stricture of the œsophagus, commencing opposite the seventh and eighth dorsal vertebra. At the lower end of the stricture is a very irregularly filled, slightly wider portion of the œsophagus. The œsophagus above the stricture is slightly dilated. The appearance is characteristic of stricture caused by œsophageal carcinoma.

Private Clinic. Prof. D. P. D. Wilkie.

FIGURE 21

FIGURE 22

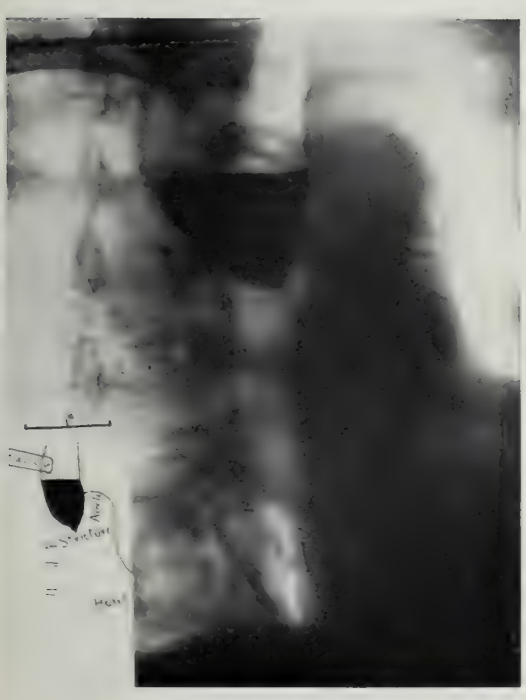


FIGURE 23

FIGURE 24

Figure 25.—MALIGNANT ŒSOPHAGUS. (See Figure 1)

Radiogram.- A well-defined stricture, with extremely irregular edges, is seen interrupting the opaque column.

Dr E. W. H. Shenton.

Figure 26.—MALIGNANT ŒSOPHAGUS. (See Figure 1)

Radiogram. The tapered, irregular lower end of the opaque column is characteristic of cancer.

Operation. Gastrostomy was done, but death ensued six months after the first symptoms.

Dr E. W. H. Shenton.

Figure 27.—DILATATION STOMACH. (See Figure 2)

A woman of 35.

Screen.—Stomach large, contour regular; tone good and peristalsis normal, waves passing up to the pylorus. It was half empty in three hours, completely so in six, by which time some had reached the transverse colon.

Radiogram.—Note the dilatation of the stomach.

Dr L. A. Rowden.

Figure 28.—SPASMODIC HOURGLASS STOMACH. (See Figure 2)

Radiogram (Postero-anterior).—The stomach is almost completely bisected as the result of spasm. That it was not organic was shown by its disappearance on re-examination.

(A piece of wire indicates the costal margin.)

Dr L. A. Rowden.

FIGURE 25

FIGURE 26

FIGURE 27

FIGURE 28

Figure 29.—GASTRIC ULCER. (See Figure 2)

Radiogram.- A well-defined ulcer is seen on the lesser curvature of the stomach. The ensuing cicatrisation has caused the development of an hourglass contraction.

N.B.—The wire indicates the costal margin.

Dr L. A. Rowden.

Figure 30.—GASTRIC ULCER. (See Figure 3)

Clinical History.—A man of 48 had pains off and on for fifteen years. They began two to three hours after food, and were relieved by more food or by making himself vomit: hæmatemesis occurred twice. He had lost weight.

Screen. Some dilatation was present, but the tone was good, though peristalsis was not very active. Tenderness was present over the notch seen on the lesser curvature. One-third of the meal remained in the stomach three hours after administration; none had then reached the cæcum. The following day all the meal had reached the colon, which was ptosed.

Radiogram.— An ulcer bearing radiating processes is seen on the lesser curvature.

Remarks.—The tenderness is indicative of activity and the processes of penetration. The delayed emptying is due to spasm at the site of the ulcer or at the pylorus.

Dr L. A. Rowden.

FIGURE 29

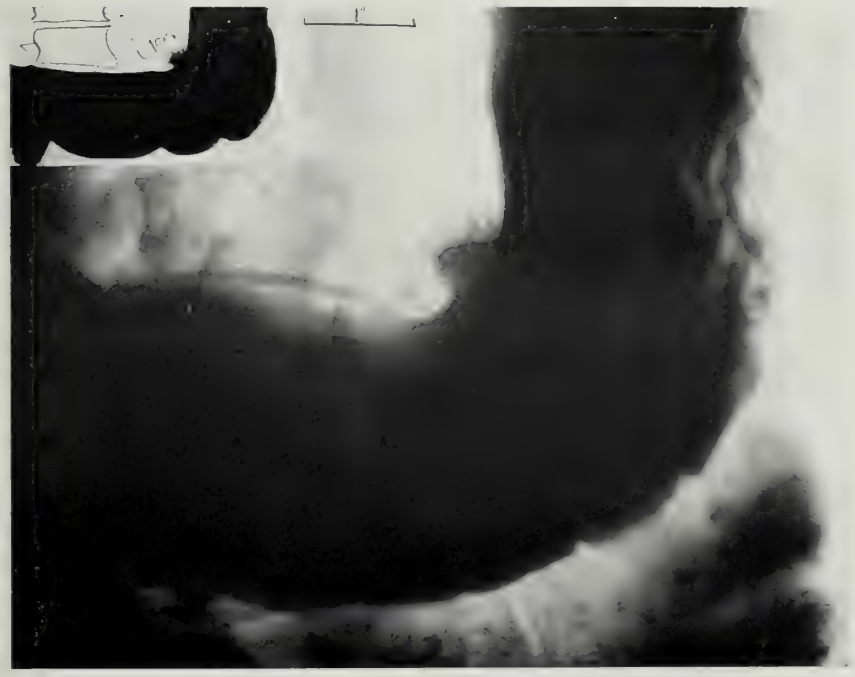


FIGURE 30

Figure 31.—GASTRIC ULCER. (See Figure 3)

Clinical History.—A man of 60 gave a history of twelve years' pain in the upper left abdomen, coming on one to two hours after food. The symptoms, at first intermittent, had now become continuous.

Radiogram.—The crater of a gastric ulcer can be seen on the lesser curvature above the incisura angularis.

Operation.—Radiogram confirmed.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 32.—GASTRIC ULCER. (See Figure 3)

Clinical History.—A male aged 43 had for three years suffered from abdominal pain of an intermittent type, associated with nausea and occasional vomiting.

Radiogram.—At the commencement of the pyloric canal is the crater of an ulcer containing barium, secretion and air from below upwards.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figures 33 and 34.—GASTRIC ULCER. (See Figures 2 and 4)

Clinical History.—A man had experienced epigastric pain, which had recently been aggravated, for many years. Much wind came up, but no vomit. He had always been thin.

The symptoms had been typical of chronic ulcer but now suggested malignant change.

Screen.—Stomach was not dilated; a large ulcer was seen on the lesser curvature. No pyloric obstruction was present; peristalsis deficient.

Radiograms.—Figure 33.—The main barium mass lies below; some gas is seen above and between these two is a large saucer-shaped ulcer. There is evidence of hourglass contraction.

Figure 34.—A fleck of barium is seen opposite the second lumbar vertebra $2\frac{1}{2}$ hours after the meal.

Dr L. A. Rowden.

FIGURE 31

FIGURE 32

FIGURE 33

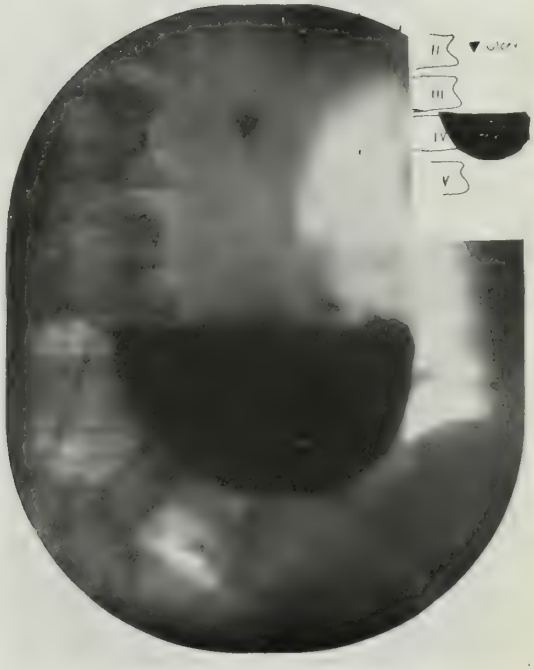


FIGURE 34

Figure 35. RECURRENT GASTRIC ULCER. (See Figure 3)

Clinical History.—For eleven years a woman, aged 63, had had indigestion and abdominal pain, coming on half-an-hour after food. Three years ago V-resection of an ulcer had been performed and, a year later, appendicectomy. On admission she was suffering from pain which occurred an hour after food, it was relieved by alkalis.

Radiogram.—A deep notch is present opposite the stitch line of the V-section, with evidence of an ulcer on the lesser curvature. There were signs of duodenal ulceration, the distal part of the stomach retaining its contents for more than twenty-four hours.

Treatment.—Absolute rest and modified Lenhartz diet relieved the pain. At her third operation the above findings were confirmed.

Mr O. A. Marxer. Dr E. I. Spriggs.

FIGURE 35

Figure 36. ULCER WITH HOURGLASS STOMACH. (See Figure 3)

Clinical History.—A woman aged 49 suffered for over thirty years with attacks of indigestion, and latterly had to exercise the greatest care in regard to both the quantity and quality of the food she took. Five weeks before examination she had a copious hæmatemesis.

Radiogram (First barium meal given 4½ hours previously, a second was given immediately prior to the photograph being taken. Upright position). Marked hourglass contraction of the stomach. The second meal is filling the proximal sac which is connected with the distal by an attenuated line of barium, having the typical eccentric "water-spout" origin. There is retention in the distal sac, with a narrowed and irregular duodenal vestibule. The duodenal cap is large.

Operation.—A tight hourglass contraction of the stomach and a marked stenosis of the duodenum from ulcer were found. A gastro-gastrostomy and a gastro-duodenostomy were performed.

Private Clinic. Prof. D. P. D. Wilkie.

Figure 37.—GASTRIC ULCER. (See Figure 2)

Clinical History.—A man aged 50 had a history of four years' epigastric pain, coming on two hours after food and relieved by taking more. He experienced nausea and salivation.

Radiogram (Right lateral. Erect).—In the hollow of the lesser curvature is seen the spike of an ulcer.

Treatment.—Three months' medical treatment caused temporary improvement except for occasional heartburn. All symptoms recurred within a year. The existence of an ulcer was confirmed at operation and gastroenterostomy performed with complete relief.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 38.—PERIGASTRITIS TUBERCULOSA. (See Figure 2)

Clinical History.—A woman of 36 suffered from phthisis and had lost 20 lb. in 10 months. She had had several attacks of hæmatemesis. Her appetite was poor and she was constipated. There was pain in the epigastrium independent of food. A soft movable epigastric tumour was palpable.

Screen.—Stomach dilated, peristalsis feeble; in the body of the organ was a filling defect. The lungs showed cavitation.

Radiogram (P.A.).—The stomach outline was markedly irregular. The outline of the intestines is visible, indicating that the irregularity is due to adherent bowel.

Dr Karl Herman.

Figure 39.—HOURGLASS STOMACH. (See Figure 3)

Screen.—No pyloric obstruction or growth. The stomach was not of the duodenal ulcer type. There was no duodenal kinking or stasis. Five hours after ingestion the meal was chiefly in the cæcum and ascending colon; the ileum was dilated.

Radiogram.—Taken 24 hours after the first meal and ¼ after the second. The stomach is divided into two parts, the upper having a horizontal superior surface. The colon is filled with opaque meal.

Remarks.—This has been termed a "cup and spill" stomach, the upper portion spilling into the lower when full. Its ætiology is unknown.

Dr L. A. Rowden.

FIGURE 36

FIGURE 37

FIGURE 38

FIGURE 39

Figure 40.—CARCINOMA STOMACH. (See Figure 4)

Radiogram (Immediate. Erect).—The stomach is hourglass in form, the condition being due to a cancer of the body of the organ.

Mr O. A. Marxer. Dr E. I. Spriggs.

FIGURE 40

Figures 41 and 42.—CARCINOMA OF THE CARDIA. (See Figure 2)

Clinical History.—A man, aged 61, had always enjoyed robust health until three months before examination. During this time he suffered from progressively increasing flatulence with firstly occasional, and then regular, difficulty in swallowing solid articles of food. During the month before examination there had been very definite loss of weight and of general strength. No tumour was palpable.

Radiograms. Figure 41 (Oblique view of the thorax immediately after the barium meal. Upright position).—There is a definite obstruction at the lower end of the œsophagus, eccentric and situated just above the dome of the diaphragm. Below this there is a filling defect in the form of a "crab claw" at the cardiac end of the stomach.

Figure 42 (The same. Upright position. Antero-posterior view of abdomen).—There is a large gas belt in the cardiac end of the stomach, causing eventration of the diaphragm with, on its medial aspect, a fungating tumour, outlined by the gas and covered with a layer of barium. Distal to this the body of the stomach is extremely narrowed. The pyloric antrum and the pylorus are normal, but deviate well to the right.

Operation.—A large growth was found involving the cardiac end of the stomach and surrounding the œsophageal opening. A gastrostomy was performed.

Private Clinic. Prof. D. P. D. Wilkie.

Figures 43 and 44.—MALIGNANT HOURGLASS STOMACH. (See Figure 3)

Clinical History.—For over six months a woman of 61 had suffered from progressive loss of appetite, flatulence and loss of general strength and energy. For a few weeks she had been troubled with pain coming on independently of meals and associated with vomiting; no tumour was palpable. There was a history suggestive of gastric ulcer twenty years previously.

Radiograms.—Figure 43 (First barium meal 4 hours previously; second, immediately before. Upright position).—Malignant hourglass stomach with a very small normal proximal sac. A very extensive filling defect of the barium content in the body of the stomach is seen especially in the greater curvature. The distal sac formed by the distal portion of the body, the pyloric antrum and the pylorus show no deformity. The duodenal cap is rather large, but regular, and the content in the second and third parts of the duodenum is well seen.

Figure 44 ($1\frac{1}{2}$ hours later. Upright position). The upper sac is only partially emptied, demonstrating the very definite obstruction caused by the tumour growth. A saucer-shaped residue is seen in the pyloric end of the stomach, and a similar one in the first part of the duodenum.

Operation.—A malignant mass, involving the body of the stomach and forming a very definite hourglass contraction, was found, and subtotal gastrectomy performed.

Private Clinic. Prof. D. P. D. Wilkie.

FIGURE 41

FIGURE 42

FIGURE 43

FIGURE 44

Figure 45.—CARCINOMA CARDIA. (See Figure 3)

Clinical History. A man aged 59 had had difficulty in swallowing solid food for three months, and had lost two stones in consequence. The symptoms were those of carcinoma of the œsophagus.

Screen. The meal was delayed at the lower end of the œsophagus. The gastric fundus did not fill. There was no delay in the exit of food from the stomach.

Radiogram. Shows a filling defect of the cardia (a peristaltic wave separates the lower two portions of meal).

Dr L. A. Rowden.

Figure 46.—CARCINOMA STOMACH. (See Figure 3)

Screen. The cardiac stomach was not dilated, its outline was regular. Except at times peristalsis was not active, the waves being arrested at the pylorus. The pylorus was free, dropping when patient became erect. A well-marked filling defect was seen in the pyloric canal. In four hours food had reached cæcum, and in two more the stomach was empty and the cæcum well filled. The following day all was in the colon.

Radiogram. The outline of the stomach ends abruptly opposite the vertebral column, the duodenum is apparent. Between, there is a filling defect.

Operation.—Diagnosis confirmed. Patient died of hæmorrhage.

Remarks.—This should have been a suitable case for removal as it was free of adhesions.

Dr L. A. Rowden.

Figure 47.—CARCINOMA STOMACH. (See Figure 3)

Clinical History.—A woman aged 54 had been vomiting for a month and had lost weight.

Screen.—A "filling defect" was visible in the pyloric canal. There was no obstruction.

Radiogram.—The pyloric canal appears to contain a projecting mass encroaching on the stomach's lumen. (Note calcification in tips of costal cartilages.)

Operation.—Inoperable carcinoma was found.

Dr L. A. Rowden.

Figure 48.—CARCINOMA OF STOMACH. (See Figure 3)

Clinical History.—A man of 71 with no previous history of dyspepsia complained of acid eructations and a sense of weight in the epigastrium. He had lost 14 lb. in a month. Palpation revealed a tumour under the left rectus above the umbilicus. It was diagnosed as a gastric cancer either primary or the result of spread from the colon.

Screen.—Stomach small, could not be distended. A well-defined filling defect seen at the pylorus which was movable. Incisura noted.

Radiogram.—The stomach is partly divided by the incisura. The pyloric canal shows a filling defect inferiorly.

Dr L. A. Rowden.

FIGURE 45

FIGURE 46

FIGURE 47

FIGURE 48

Figure 49.—PYLORIC CARCINOMA. (See Figure 9)

Clinical History.—A woman aged 41 had been operated on one year previously for malignant growth of left ovary. For three months she had had persistent pain in epigastrium, loss of appetite, loss of weight and occasional vomiting. A mass was palpable in the epigastric region to the left of the mid-line.

Radiogram (Upright, 4 hours after a Barium meal). Demonstrates gastric and duodenal residues. The stomach is low. The pyloric antrum and pylorus are very deformed and fill irregularly, due to the encroachment of the tumour upon the lumen. The tumour ends abruptly at the entrance to the duodenum, causing a flattened and rectangular duodenal cap. The remainder of the meal is in the coils of small intestine.

Operation.—The mass proved to be a carcinoma involving the pyloric end of the stomach. A partial gastrectomy was successfully performed.

Private Clinic. Prof. D. P. D. Wilkie.

Figure 50. "LEATHER-BOTTLE" STOMACH. (See Figure 3)

Clinical History.—A man aged 60 complained of persistent vomiting for a period of six weeks, associated with great loss of weight and strength. He denied all previous digestive trouble, but admitted that he had been losing weight over a period of three or four months.

Radiogram. Typical appearance of a small tubular stomach, situated high in the abdomen, emptying extremely rapidly and not varying in position with change of attitude of the body. The faint tubular outline, sloping downward to the right to a dependent well of bismuth in the first part of duodenum, is typical of the condition.

Operation.—The stomach was infiltrated throughout every part, small, firm and of typical leather-bottle consistence. Total gastrectomy was performed.

Private Clinic. Prof. D. P. D. Wilkie.

Figure 51.—CARCINOMA STOMACH. (See Figure 2)

Clinical History.—A woman aged 65 had experienced indigestion and a sinking feeling—which had lasted nine months—two hours after each meal. She had vomited occasionally, much wind had passed up. Lately there had been disinclination for food, and she had lost three stones in weight. The bowels were constipated.

Screen.—The pyloric stomach was tubular and refused to distend, each addition of meal simply overflowing into the duodenum. It emptied in two hours.

Radiogram ($\frac{1}{4}$ hour).—Shows a normal fundus but a narrowed tubular body whose margins are irregular.

Operation.—Inoperable carcinoma was found: death occurred three months later.

Dr L. A. Rowden. Mr L. R. Braithwaite.

Figure 52.—PANCREATIC CYST. (See Figure 4)

A male of 62.

Screen.—Stomach horizontal in type. The middle portion was held up by a tumour lying beneath it. The organ emptied in four hours; in six, barium had reached the cæcum.

Radiogram.—The stomach contains opaque meal whose upper level is horizontal; above, it contains gas. The greater curvature shows a large regular indentation.

Remarks.—This indentation was probably caused by a cyst of the mesentery or pancreas. Unfortunately there were no confirmatory notes.

Dr L. A. Rowden.

FIGURE 49

FIGURE 50

FIGURE 51

FIGURE 52

Figures 53 and 54. CONGENITAL PYLORIC STENOSIS

Clinical History. This was a full-term child, weighing 9 lb., who put on 1 lb. in ten days, when vomiting began and increased in spite of changes in diet. On admission he was 8 lb., the vomiting was projectile, there was marked constipation. Peristalsis was visible: there was a suggestion of a tumour on palpation.

Screen.—No peristalsis seen, no food passed in six hours.

Radiograms.—Are almost identical, though taken with an interval of 6 hours. The barium lies as a mass close to the pylorus.

Operation.—Gas and oxygen anæsthesia and novocain were employed. A hard, thickened pylorus was found and the Ramsted operation performed. The following day tetanus developed, so parathyroid, $\frac{1}{10}$ gr., calcium lactate, 5 gr., and chloretone, $\frac{1}{2}$ gr., were given per rectum. He gradually improved, but the stools were green for several days.

Result.—Three weeks after operation he had put on 1 lb. in weight and has progressed steadily during the last eight months.

Dr A. C. Fowler. Mr A. Mitchell.

Figures 55 and 56.—CONGENITAL PYLORIC STENOSIS

Clinical History.—A boy, who weighed 8 lb. at birth, was bottle fed. Vomiting, soon becoming projectile, appeared shortly and he lost weight. Peristalsis was visible but no tumour palpable. There was some food residue in the stools.

Radiograms (At 3 weeks).—Figure 55 (Immediate).—Merely a trickle of barium is leaving the stomach.

Figure 56 (8 hours later).—A large stomach residue is present; the "head" of the meal has reached the splenic flexure.

Subsequent History.—In view of the incomplete obstruction the case was treated medically. Symptoms gradually subsided, so that in a month he had gained 3 oz. Improvement was such that, three months later, X-rays showed no abnormality and in six months he was normal weight.

Dr A. C. Fowler.

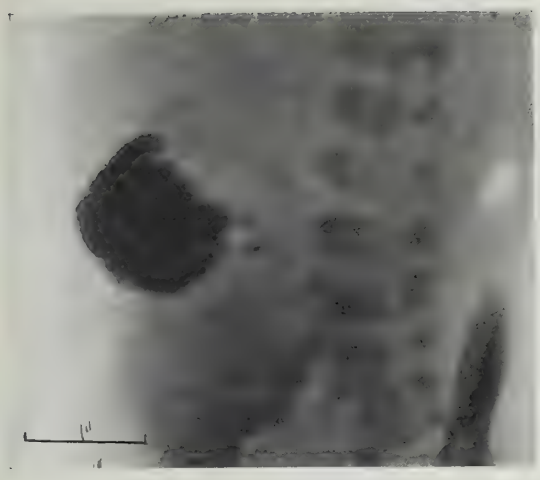


FIGURE 53

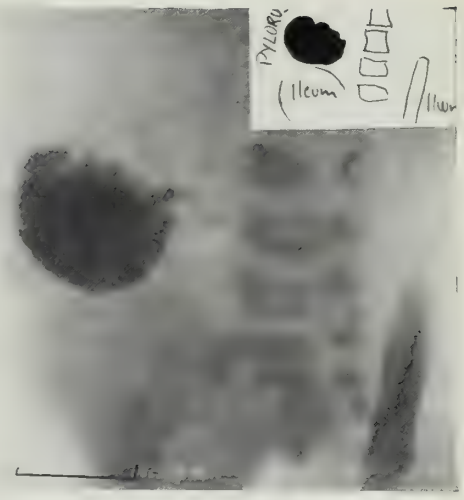


FIGURE 54

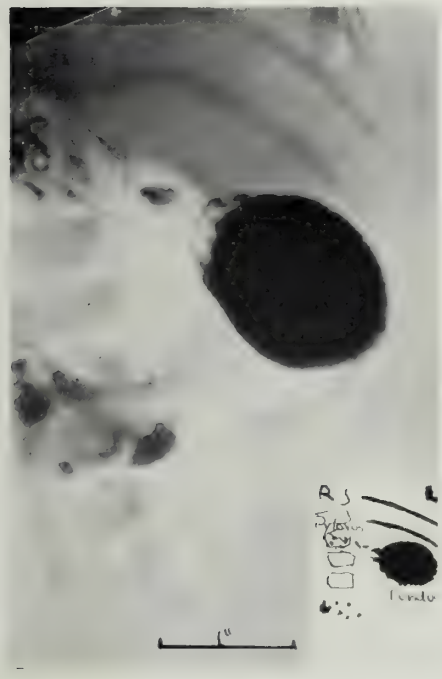


FIGURE 55

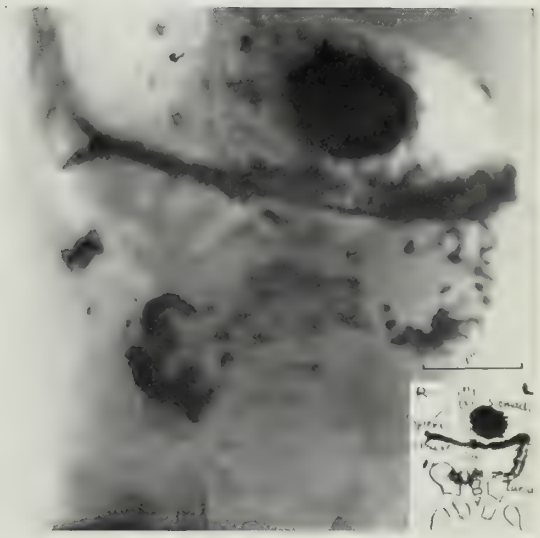


FIGURE 56

Figure 57.—DUODENAL ULCER. (See Figure 4)

Clinical History.—The patient, a man aged 47, had typical symptoms of duodenal ulceration.

Screen.—Stomach small and hypertonic, with well-marked peristaltic waves, emptying in one hour. An ulcer crater was apparent in the duodenum; pressure on it caused pain. No disease elsewhere. In five hours all the food was in the cæcum and transverse colon, which was not ptosed. The appendix was not visible, no tenderness over its site.

Radiogram (5 hours later).—Shows the meal to have passed the small intestine. A perfect ulcer crater is apparent in the duodenum, implying penetration. The large intestine is filled with barium.

Operation.—A duodenal ulcer was found and gastroenterostomy performed with success.

Dr L. A. Rowden.

FIGURE 57

Figure 58.—DUODENAL ULCER. (See Figure 5)

History.—A man aged 38 had had abdominal pain for some years with periods of intermission. The pain occurred at any time and was sometimes relieved by taking more food or by lying on his right side. He was anæmic and losing weight. His appendix had been removed without curing his pain.

Screen.—The stomach was dilated and peristalsis irregular, at times it was very active. Organic pyloric obstruction was shown by the fact that after three hours half the food remained in the stomach. The first part of the duodenum was adherent to the liver.

Radiogram.—Most of the food appears in the stomach, which is dilated. The pyloric canal and the duodenum are comparatively empty. The latter can be identified as far as its third part.

Diagnosis.—The diagnosis of a relapsing ulcer of the duodenum with pyloric obstruction was confirmed by operation, as was the hepatic adhesion. The ulcer was a large one on the anterior surface.

Dr W. H. Rowden. Mr J. Basil Hall.

Figure 59.—DUODENAL ULCER. (See Figure 5)

Screen.—The stomach was not dilated, marked peristalsis was observed, the organ emptying in two hours. No duodenal stasis present. In five hours food had reached the transverse colon.

Radiogram. In spite of the fact that only ¼ hour had elapsed before the picture was taken the meal is visible in the jejunum. The duodenum is well seen. The stomach shows at least eight indentations due to peristalsis.

Remarks.—The diagnosis depended on indirect evidence.

Dr L. A. Rowden.

Figure 60.—GALL-BLADDER. (See Figure 5)

Radiogram.—The duodenal cap is distorted by the pressure of an enlarged gall-bladder. The jejunum is well seen.

Dr L. A. Rowden.

Figure 61.—DUODENAL ULCER. (See Figure 3)

Clinical History.—For ten years a patient, a woman of 68, had ill-defined intermittent pains in the right upper abdomen coming on two hours after meals. Latterly they had been more severe.

Radiogram.—A fleck of barium on the inner side of the duodenum indicates an ulcer on its posterior surface.

Operation.—While under treatment the patient had a severe hæmorrhage from which she rallied slowly. This was repeated and when she was operated upon a duodenal ulcer was found and gastric enterostomy done with cessation of symptoms.

Mr O. A. Marxer. Dr E. I. Spriggs.

FIGURE 58

FIGURE 59

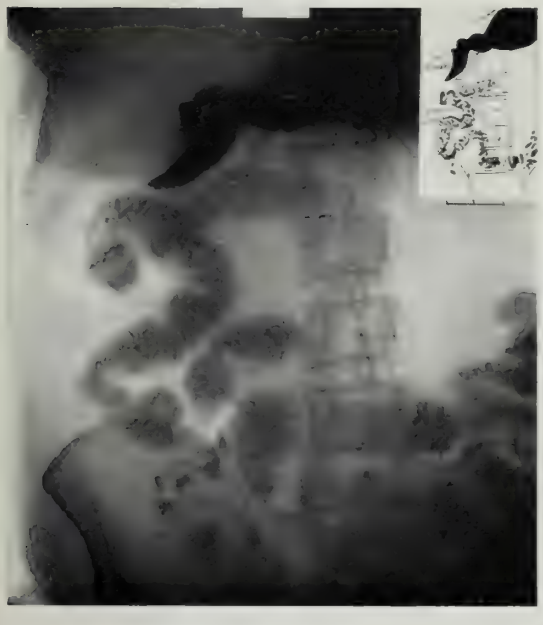


FIGURE 60

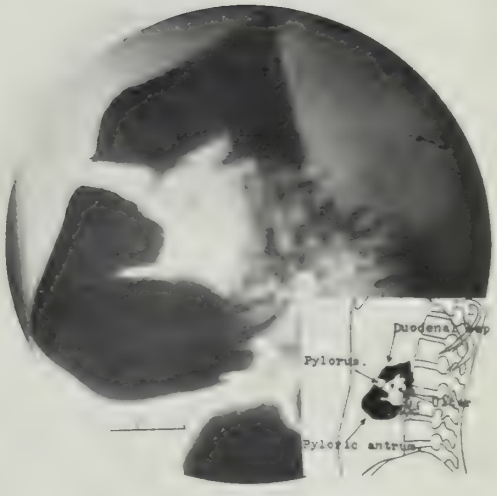


FIGURE 61

Figure 62.—DUODENAL ULCER. (See Figure 4)

Clinical History.—For ten years a patient, a female aged 66, had had attacks of pain and discomfort after food, occurring at intervals. On admission she had pain in the epigastrium, which ascended to the chest, sometimes radiating to the left shoulder. It was worse late in the afternoon and at bedtime.

Screen.—Continuous spasm of the duodenum was present; there was irregularity of its mesial border just beyond the pylorus.

Radiogram.—Note the spasm of the first part of the duodenum. Two minute gall-stones are visible.

Operation.—A duodenal ulcer adherent to the pancreas was found and gastroenterostomy performed. The gall-bladder was removed; it contained five small calculi. Complete relief resulted.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 63.—DUODENAL ULCER. (See Figure 4)

Clinical History.—A woman aged 32 had intermittent attacks of pain after her midday meal for a period of ten years. Appendicectomy had afforded no relief.

Radiogram.—The mesial border of the duodenum, close to the pylorus, presents an irregularity which the screen showed to be fixed. The diagnosis of a duodenal ulcer with adhesions was made.

Operation.—X-ray findings were confirmed and gastroenterostomy performed, with relief of symptoms.

Mr O. A. Marxer. Dr E. I. Spriggs.

FIGURE 62

FIGURE 63

Figure 64.—GASTROENTEROSTOMY. (See Figure 5)

Clinical History.—The operation was performed twelve years ago. The symptoms now suggested either narrowing of the opening or a jejunal ulcer.

Screen.—The stomach was dilated, horizontal adhesions were present. The artificial opening was not functioning and in two hours no meal had passed out, only half having done so in five hours. Peristalsis was active and pyloric obstruction marked.

Radiogram. The barium lies chiefly in the stomach, a trickle in the duodenum and the rest in the ileum. Three peristaltic waves are seen.

Remarks.—The anastomosis having become occluded and the pylorus being closed there was great urgency for operative relief.

Dr L. A. Rowden.

Figure 65.—GASTROENTEROSTOMY. (See Figure 5)

Clinical History.—The operation was performed two months ago on a male aged 40. Since then he has been vomiting bile in quantities. He had had much pain and discomfort after meals.

Screen. Stomach somewhat dilated, the anastomosis was patent, food passing rapidly through it and collecting in a loop of intestine on the right, little remaining on the left side. The organ emptied in four hours. Though none appeared in the rectum, the meal had reached the colon the following day.

Radiogram.—The stomach is empty above the opening save for some wavy streaks. The position of the short circuit is readily seen.

Subsequent History. Two years later he felt very weak, periodical attacks of vomiting occurring every few days.

Screen.—The opening functioned well, it was tender.

Remarks.—Though there was no record of the type of operation it is very probable it was an anterior one, a vicious bile circulation having been established.

Dr L. A. Rowden.

Figures 66 and 67.—GASTROENTEROSTOMY. (See Figure 5)

Clinical History.—A woman aged 37 had the operation done seven years ago for the relief of a duodenal ulcer. She was very ill for some time. Lately she had experienced nausea, but no vomiting. There was epigastric pain but no fullness.

Screen. Anastomosis patent, the food passing slowly through it and by way of the pylorus. The stomach emptied in two hours, no evidence of jejunal ulcer.

Radiograms.—Figure 66 ($\frac{1}{2}$ hour afterwards).—Shows the main mass in the stomach, streaks are visible in the duodenum and issuing from the new opening.

Figure 67 (2 hours later).—Reveals the majority of the meal in the ileum and cæcum. A little still remains in the stomach, some can be seen escaping through the artificial opening.

Dr L. A. Rowden.

FIGURE 64

FIGURE 65

FIGURE 66

FIGURE 67

Figure 68. GASTROENTEROSTOMY FOR DUODENAL ULCER. (See Figure 5)

Clinical History.—Six months previously a man aged 40 was operated on for duodenal ulcer with marked dilatation of the stomach. A posterior vertical gastroenterostomy with a lateral anastomosis between the two loops was carried out.

Radiogram (Upright, 1¼ hours after second barium meal, 6 hours after first—stomach empty when examined 4½ hours later).—One-third of the meal is still in the stomach, which is low, with a narrow pylorus running into an irregular, comma-shaped duodenal cap. The jejunal loop is seen filling through the gastroenterostomy stoma, which is close to the pyloric antrum, small but quite regular. The six-hour meal has reached the proximal end of the transverse colon.

Private Clinic. Prof. D. P. D. Wilkie.

Figure 69. GASTROENTEROSTOMY FOR DUODENAL ULCER. (See Figure 5)

Clinical History.—Eight months previously a posterior vertical gastroenterostomy was performed for a chronic duodenal ulcer causing stenosis in a man aged 56. There had been a typical history of intermittent indigestion for five years.

Radiogram (Erect, after 10 minutes).—The meal is filling the distal portion of the stomach, and from there is discharging via the gastroenterostomy stoma into the efferent jejunal coil and remainder of jejunum. The stoma is situated close to the pylorus, and shows no narrowing or irregularity. A small amount of the meal is passing through the pylorus into a well in the first part of the duodenum.

Private Clinic. Prof. D. P. D. Wilkie.

Figure 70.—GASTROENTEROSTOMY. (See Figure 5)

Clinical History. Gastroenterostomy was performed nine years ago with complete relief until recently, when his old symptoms returned. He experiences hunger-pain which, coming on one to two hours after food, is relieved by more food. The pain is chiefly epigastric, but radiates to the back also. The pain is relieved by the passage of flatus.

Screen.—Stomach not enlarged and tone good, though no peristalsis was observed. The organ emptied in three hours by which time some barium had reached the cæcum.

Radiogram.—The main mass of barium lies in the stomach, but a trickle appears issuing through the opening to collect in the intestines.

Dr L. A. Rowden. Late Mr H. Littlewood.

Figure 71.—GASTROENTEROSTOMY. (See Figure 5)

Clinical History.—The operation was performed ten years ago for duodenal ulcer on a man aged 53, but symptoms persisted. The pain wakened him regularly at three A.M. He suffered greatly from flatulence and had lost weight.

Screen.—The stomach was small, rapid emptying took place through the anastomosis, no food passing by way of the duodenum. No tenderness over the site of the anastomosis. There was no evidence of jejunal ulcer.

Radiogram (5 minutes after meal).—The fundus is occupied by gas, the body by opaque meal, whilst the intervening part shows streaks of barium. The meal can be seen passing through the opening into the jejunum, which is well filled.

Dr L. A. Rowden.

FIGURE 68

FIGURE 69

FIGURE 70

FIGURE 71

Figures 72 and 73.—JEJUNAL ULCER. (See Figure 5)

Clinical History. A man aged 47 had had a duodenal ulcer for which a posterior gastroenterostomy was performed 1¼ years ago. Several times during the last two years he had had haematemesis and melæna and suffered from continuous indigestion and epigastric pain coming on two to four hours after food and associated with flatulence.

Screen. The meal during filling was seen to rise in the proximal loop to the level of the duodeno jejunal flexure before entering the distal limb of the jejunum.

Radiograms.—Figure 72 (½ hour after meal—prone).—Shows the high position of the stoma with a large jejunal ulcer some two inches from it. There is pyloric obstruction.

Figure 73 (12 hours later—supine). The barium has lodged in a saucer-shaped ulcer just above the colon whose outline is irregular pointing to inflammation.

Operation. A jejunal ulcer was found burrowing into the transverse mesocolon threatening to form a jejuno colic fistula. The old anastomosis was resected and the openings closed and a gastroduodenostomy was performed. Complete relief of symptoms and improved nutrition followed.

Remarks.—The residue in the ulcer and the irregularity of the colon are pathonognomonic of penetration.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 74.—JEJUNAL OBSTRUCTION. (See Figure 5)

Radiograph. The stomach is partly filled by barium and the duodenal cap occupied by air. The jejunum—readily recognised by the valvulæ conniventæ—is greatly distended.

Dr L. A. Rowden.

Figure 75.—PERFORATED DUODENAL ULCER. (See Figure 5)

Radiogram.—A collection of gas is seen elevating the right cupola of the diaphragm and depressing the liver. It resulted from a perforated duodenal ulcer.

Remarks.—The elevation of the diaphragm closely resembles that caused by subphrenic abscess.

Dr T. I. Candy.

FIGURE 72

FIGURE 73

FIGURE 74

FIGURE 75

Figure 76. DUODENAL DIVERTICULUM. (See Figure 5)

Clinical History.—A woman of 66 had had epigastric discomfort for eight months, which came on an hour after food and at night. There was flatulence and vomiting of bile in the morning.

Radiogram. A diverticulum bearing three tongue-shaped processes is seen projecting from the second part of the duodenum. It was tender on pressure and appeared to lie in the pancreas.

Results. The symptoms disappeared under general treatment.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 77.—DUODENAL ILEUS. (See Figure 5)

Clinical History.—A woman of 29 had typhoid nine years ago and appendicectomy five years later. A year after her operation she vomited thrice daily for three months: the vomiting had no relation to food. She had improved since then, but her appetite was poor: she often had a temperature of 99° F. Recently she had felt swelling and rigidity to the left of the umbilicus, and a dragging sensation in the left groin associated with nausea.

Radiogram.—The duodenum, as far as its third part, is dilated with gas. In front of the second lumbar body is a constriction. The stomach had not emptied itself 9 hours after the meal.

Operation. Duodenal dilatation was confirmed and found to be due to pressure of the superior mesenteric vessels. Other organs were healthy. Gastroenterostomy was performed with complete relief of symptoms.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figures 78 and 79.—GALL-STONES

Clinical History.— A patient, a woman of 46, had typhoid twenty years ago and diphtheria five years later, since when fibrositis had developed in the limbs and back. There had been four severe attacks of pain in the right upper abdomen which ensued after food and were not accompanied by vomiting. There was achylia gastrica.

Radiograms.—Figure 78 (Supine—anterior view).—A row of stones is seen lying along the twelfth rib.

Figure 79 (Prone—posterior view).—The row of stones has curled up in the fundus.

Mr O. A. Marxer. Dr E. I. Spriggs.

FIGURE 76

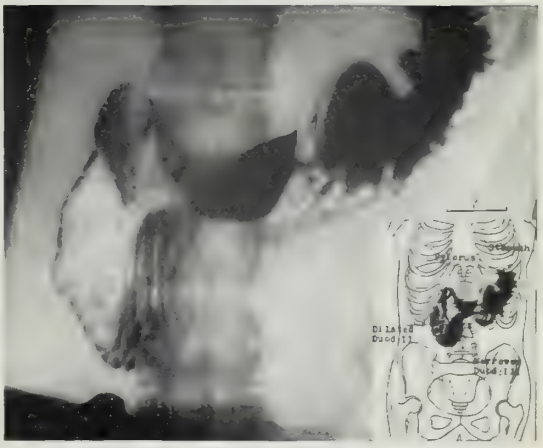


FIGURE 77

FIGURE 78

FIGURE 79

Figure 80.—GALL-STONES. (See Figure 10)

Clinical History. A male of 55 complained of epigastric pain coming on two hours after food of any kind. It was of a colicky nature, and was not relieved by more food. It had been worse during the past few years.

Screen.—Stomach and duodenum normal.

Radiogram. The opaque meal is in the cæcum and colon. Above and to the left of the hepatic flexure are two gall-stones, the larger in the bladder, the lesser—showing the pathenognomonic "wedding-ring" appearance—is in the cystic duct.

Dr L. A. Rowden.

Figure 81.—GALL-STONES

Clinical History. A man 66 years of age had been suffering from myocarditis with failing compensation and arteriosclerosis; he was also a subject of diverticulosis. Three weeks ago he was seized with sudden, sharp, griping pain. It started in the epigastrium and radiated over the rest of the abdomen and was followed by vomiting which conferred relief.

Radiogram (Supine). A string of gall-stones is seen about an inch below and parallel to the last rib. Many show the pathonognomonic "wedding-ring" appearance.

N.B.—Spondylitis is present in the column as far as the third lumbar disc.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 82.—GALL-STONES

Clinical History.—Seven years ago a woman aged 67 had pain in the right hypochondrium with indigestion. Four years later an attack was associated with pyrexia. For the last three years she had indigestion, which was worse at night, and obstinate constipation. She had mitral regurgitation.

Radiogram (Supine—posterior view). A collection of about eighteen gall-stones are seen opposite the second and third lumbar vertebræ.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 83.—GALL-STONES

Clinical History.—A woman of 67 had attacks of pain in the right abdomen, beginning twenty years ago: they were relieved by fasting and hot applications. Latterly the only symptom was flatulent dyspepsia. She had osteoarthritis.

Radiogram.—Note the oval outline of a large solitary stone opposite the tip of the last rib; there is merely a shell of calcium salts on it. The outline of the gall-bladder is just visible.

Operation.—Radiogram confirmed, cholecystectomy was performed.

N.B.—Irregular ossification of the tips of the costal cartilages.

Mr O. A. Marxer. Dr E. I. Spriggs.

FIGURE 80

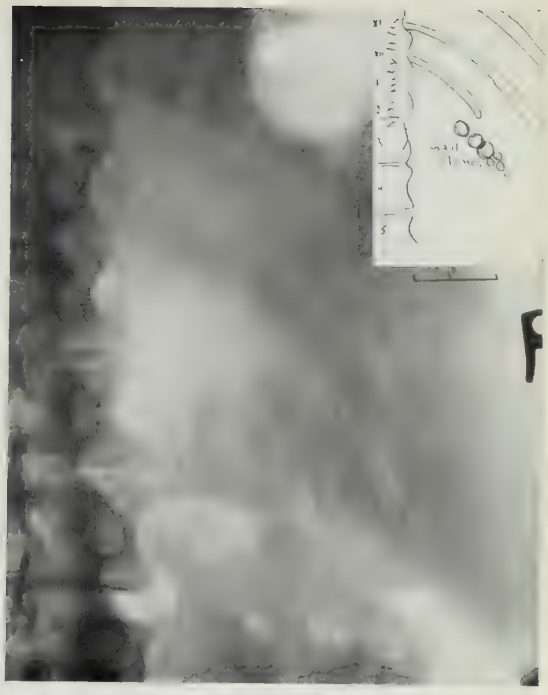


FIGURE 81

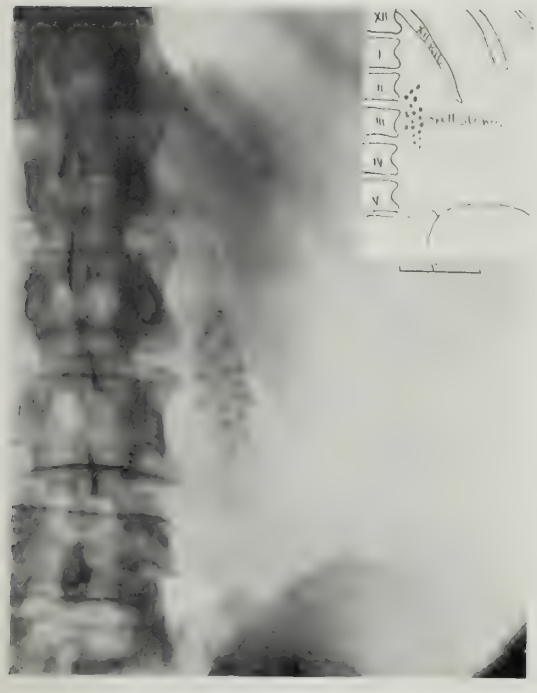


FIGURE 82

FIGURE 83

Figure 84. BILIARY AND RENAL CALCULI (showing different densities)

i. Large gall-stone and three small ones.
ii. Faceted stones, many showing "wedding-ring" appearance.
iii. Multiple stones, showing development of "mosaic."
iv. Multiple stones, showing development of "mosaic."
v. Faceted stones, whose centres are denser than their peripheries.
vi. Large stones formed by deposition around small ones.
vii. Oxalate calculus of kidney—note far greater density than gall-stones.
viii. Small stones—note crenation.
ix. Single cholesterin stone—note slight opacity.
x. Calculus forming cast of renal pelvis.
xi. Renal calculi.
xii. Renal calculi.

Dr L. A. Rowden.

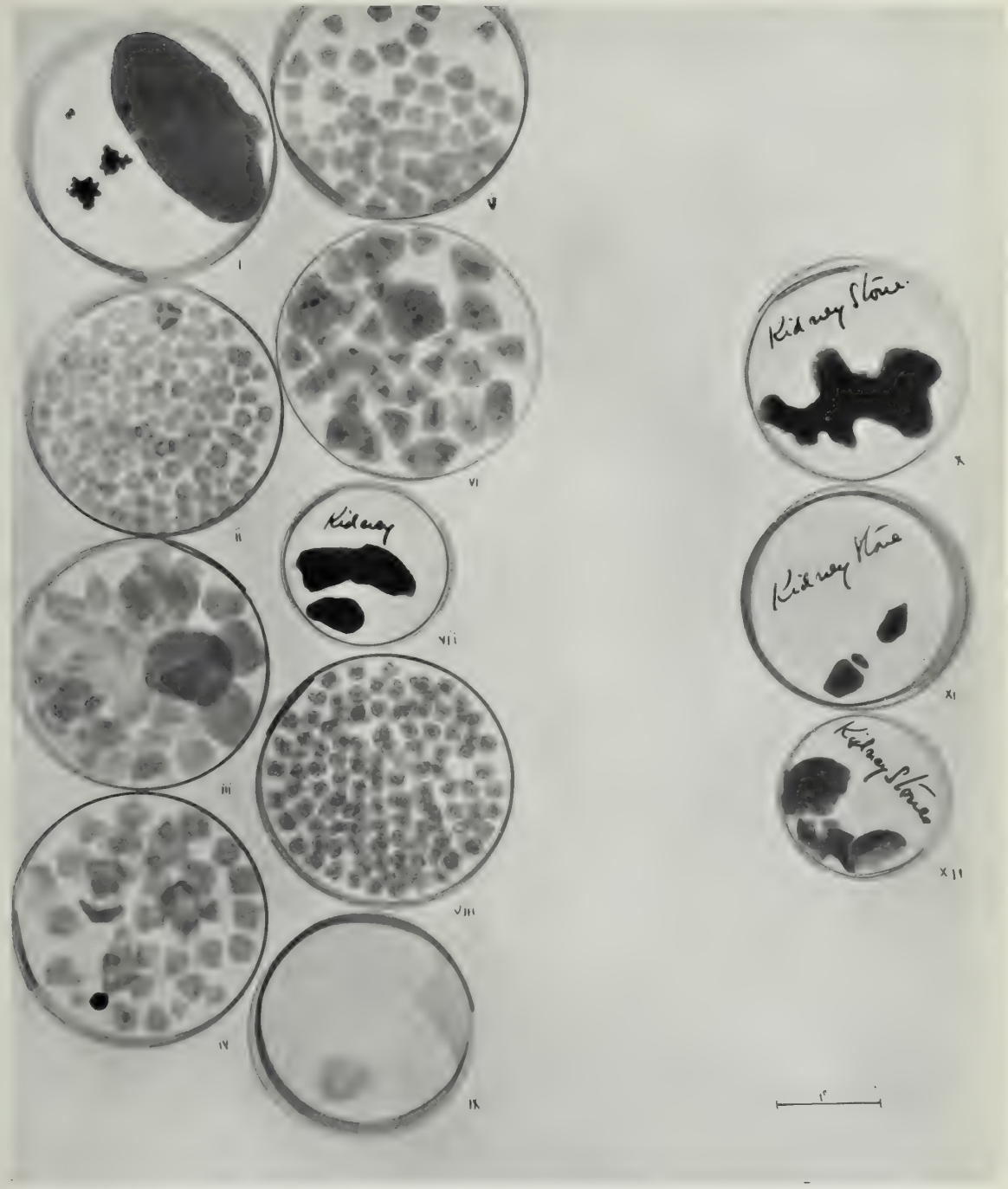


FIGURE 84

Figures 85-88. GALL-BLADDER (GRAHAME METHOD)

Clinical History. A man, aged 36, had enteric thirteen years ago. Since then he has suffered from neuritic pains. Advanced spondylitis deformans was now present.

Screen.—A dense gall-bladder shadow was seen.

Radiograms.—After tetrabromidophenalphthalein injection into the vein.

Figure 85.—4 hours. The gall-bladder is visible below the last rib: it has just begun to fill. (Gas is present in the hepatic flexure.)

Figure 86.—8 hours. The organ is abnormally distended.

Figure 87.—10½ hours. The viscus has discharged a considerable amount of its contents.

Figure 88.—24 hours. The gall-bladder is almost empty.

Note.—Oral administration of tetraiodophenalphthalein is preferable to above.—E. I. S.

Mr O. A. Marxer. Dr E. I. Spriggs.

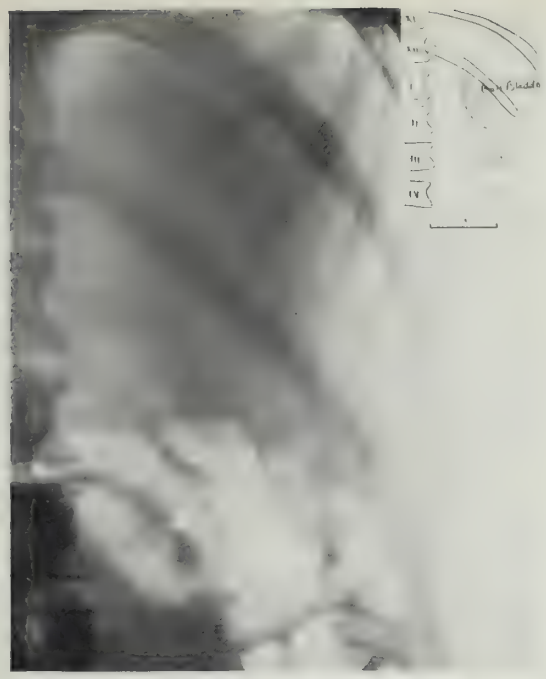


FIGURE 85

FIGURE 86

FIGURE 87

FIGURE 88

Figure 89.—SHOT IN APPENDIX. (See Figure 10)

Radiogram (P.A.)—One small and one large shadow are seen in front of the sacrum. The latter is the characteristic shape of a uretral stone, it is too near the mid-line however.

Operation.—Two collections of shot were found in the appendix. One contained sixteen, and the other two, pellets.

Remarks. The shot had no doubt been ingested with game.

Dr L. A. Rowden.

Figure 90.—SHOT IN APPENDIX. (See Figure 10)

A male of 31.

Screen.—Two pellets were visible in the appendix, they could be separated, showing the absence of inflammation.

Radiogram.—The appendix contains opaque meal, at its tip are two pieces of shot.

Subsequent History. Repeated screening was done: finally, after three weeks, the shot was expelled.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 91.—APPENDICITIS. (See Figure 10)

Radiogram.—The appendix which is pelvic in position shows irregular distribution of barium due to concretions.

Dr L. A. Rowden.

Figure 92.—APPENDICITIS. (See Figure 10)

Clinical History.—A man aged 41 had, for three months, experienced pain just below the umbilicus.

Screen.—Stomach normal, emptied in two hours, no duodenal stasis. In five hours some of the meal appeared in the transverse colon.

Radiograph (Taken 3 days after the meal).—Shows the appendix to be irregularly filled with barium; such irregularities are due to concretions.

Dr L. A. Rowden.

Figure 93.—CHRONIC APPENDICITIS. (See Figure 10)

Clinical History.—A man complained of pain radiating to the right hypochondrium. There was jaundice and moderate pyrexia.

Screen.—The cæcum and appendix were almost subcostal.

Radiogram.—An extero-retrocæcal appendix containing meal and gas is seen. Spasm is seen in three places.

Operation.—The proximal two-thirds of the appendix was adherent to the cæcum. The peritoneal surface appeared normal, but on opening the organ three ulcers were found at the sites of the spasms. The gall-bladder and ducts were normal.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 94.—CHRONIC APPENDICITIS. (See Figure 10)

Clinical History.—A history of six years' flatulence, heartburn, wasting and debility, was given by a man of 36. The symptoms had been worse during the last two years. He had been treated for dilated stomach; colectomy had been advocated.

Screen.—The cæcum was seen, fixed to the pelvis, eight hours after meal.

Radiograms.—The appendix is directed upwards medial to the cæcum. Part is dilated, but near the tip is a marked construction beyond which the shadow of a concretion is visible. This mass could not be separated from the colon, which showed evidence of adhesions.

Operation.—The position was confirmed; the appendix had a complete narrow mesentery. Beyond the kink it was distended, then came a constriction which separated this part from a concretion. The apex was bound to the colon.

Remarks.—Complete recovery.

Mr O. A. Marxer. Dr E. I. Spriggs.

FIGURE 89

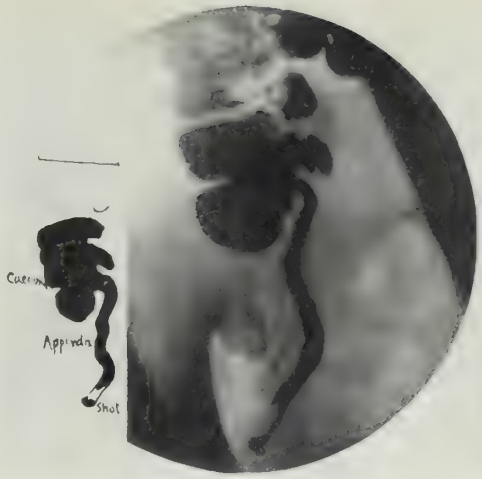


FIGURE 90

FIGURE 91

FIGURE 92

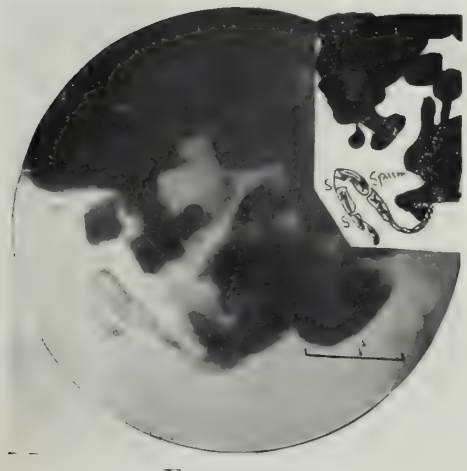


FIGURE 93

FIGURE 94

Figures 95 and 96.—APPENDICITIS. (See Figure 10)

Clinical History.—A man aged 29 had experienced fullness, discomfort and nausea after food for five years, and hyperchlorhydria.

Screen.—The appendix was fixed by an adhesion of such strength as to be capable of suspending the cæcum in the erect position.

Radiogram.—Figure 95.—The appendix is somewhat distended proximal to its kink. Its outline throughout is irregular; the tip contains a concretion.

Operation. The middle third of the appendix was looped up by old and recent adhesions. It was removed (Fig. 96).

Result.—Complete relief.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figures 97-99. CHRONIC APPENDICITIS. (See Figure 10)

Clinical History.—A male of 23 had suffered from attacks of diarrhœa since childhood. There was frequently mucus in the fæces. He was subject to pain, nausea, heartburn, irritability and depression. Charcoal, sour milk and ionisation had been tried without success.

Screen.—An obstruction was present in the appendix.

Radiograms. Figure 97 (10 hours after meal).—The appendix is distended and shows the characteristic appearance of barium spreading round a concretion.

Figure 98 (2 days after meal). Appendix still contains barium; spasm is present at one point.

Operation.—The appendix was thick and œdematous and contained several concretions (Fig. 99).

Result.—Digestion improved greatly and the colitis now yielded to treatment.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figures 100-102A.—CHRONIC APPENDICITIS. (See Figure 10)

Clinical History. A youth, aged 16, gave a long history of abdominal discomfort and indigestion. Six weeks ago he had an attack of pain in the right iliac fossa and a temperature of 100° F.

Screen.—The appendix filled unevenly, spasm being present. It was fixed and kinked.

Radiograms.—Figure 100.—The appendix is mottled; at one point spasm is present, evidenced by an abrupt gap in the opaque material.

Figure 101.—Twenty days after Figure 100 the organ had failed to empty.

Operation.—The appendix was bulbous, inflamed and anchored to the brim of the pelvis. Its distal part was fixed and near the tip were three concretions. The mucous lining was seen to be ulcerated (Figs. 102 and 102A).

Mr O. A. Marxer. Dr E. I. Spriggs.

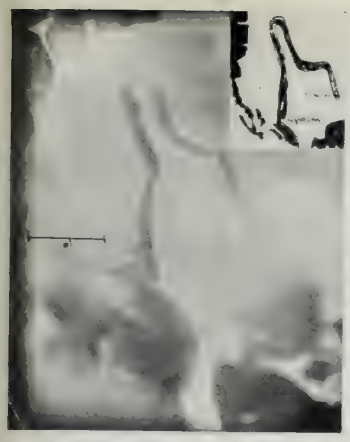


FIGURE 95

FIGURE 96

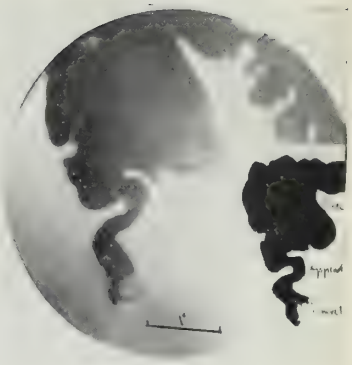


FIGURE 97

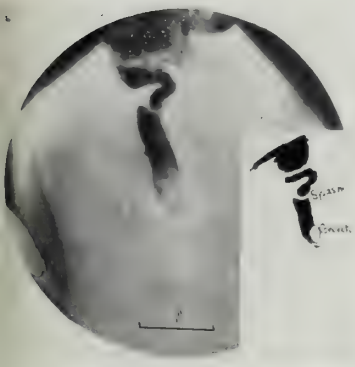


FIGURE 98

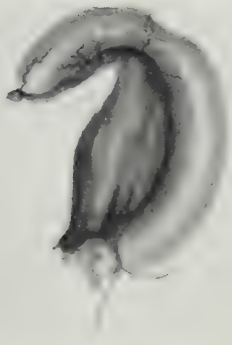


FIGURE 99

FIGURE 100

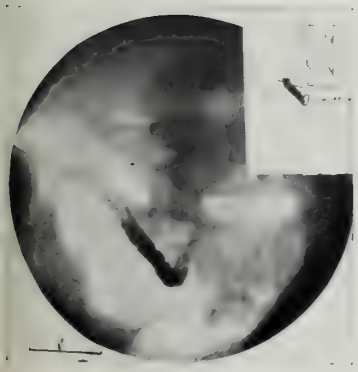


FIGURE 101

FIGURE 102

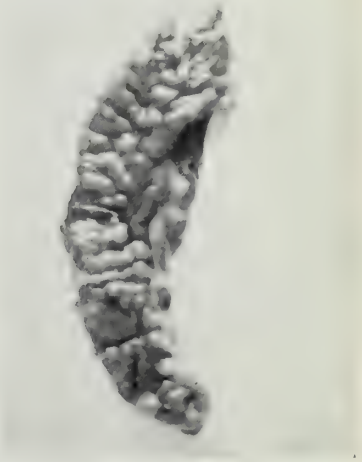


FIGURE 102A

Figures 103 and 104.—COLITIS. (See Figure 10)

Clinical History. A man aged 23 developed colitis after influenza. There was diarrhœa, with the passage of blood and mucus, for three years. He was thin, but not anæmic. Bacteriological examination of the fæces was negative.

Screen. The colon contained but little opaque meal, being contracted almost throughout: the meal rushed through these parts but there was inhibition elsewhere.

Radiograms.—Figure 103.—Barium meal (9 hours). Barium is seen in the ileum, cæcum, descending and sigmoid colons. The ascending colon contains a trail, but the transverse and upper descending parts are almost devoid of it.

Figure 104.—Enema. Note the irregular outline of the transverse colon and its lack of segmentation. Some barium has entered the ileum.

Result.—Treatment of rest in bed, medicine and diet led to steady improvement, the patient gaining 10 lb.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figures 105 and 106.—COLITIS. (See Figure 10)

Clinical History.—For nineteen years a woman aged 37 had attacks of colitis; during intervening periods she was well and did hard work. When ill she had frequent spasms of colicky pain, followed by precipitate defæcation. The stools were loose and contained pus, blood and Charcot-Leyden crystals: a hæmolytic streptococcus was isolated from them; moderate leucocytosis (13,000) was present.

Radiograms.—Figure 105.—Taken 8 hours after the meal (prone).

Figure 106.—Taken a few seconds after Figure 105.

The general contour of the colon is the same in both, but in Figure 106 a streak of opaque meal is seen to have travelled into the descending colon.

Mr O. A. Marxer. Dr E. I. Spriggs.

FIGURE 103

FIGURE 104

FIGURE 105

FIGURE 106

Figure 107.—CARCINOMA SIGMOID. (See Figure 10)

Clinical History.— A man of 77 had increasing constipation for six months: much flatus was voided. Frequent desire for stool was followed by the passage of hard, small, broken fæces. He had lost weight.

Radiogram.— Enema. For a distance of 14 cm. the sigmoid is narrowed; above this is dilatation indicating obstruction.

Operation.— Sigmoidoscopy—a buttonhole lumen was seen 17 cm. from the anus. At operation a ring carcinoma, with secondaries in the omentum, was found, so a palliative colostomy was done.

Mr O. A. Marxer. Dr E. I. Spriggs.

FIGURE 107

Figures 108 and 109.—CARCINOMA CÆCUM. (See Figure 10)

Clinical History.—A history of constant pain in the left chest and abdomen, and diarrhœa without blood or mucus, was given by a man aged 63, who had been losing weight. A soft swelling, tender to pressure, was palpable in the right loin.

Screen.—Opaque meal rushed through from the ileum to the hepatic flexure.

Radiograms.—Figure 108.—Opaque meal. Barium is seen in the ileum and transverse colon, but between these two is a large gap containing traces only, finger-print impressions are seen.

Figure 109.—Enema. The barium is arrested proximal to the hepatic flexure.

Note.—Several phleboliths.

Operation.—A fungating carcinoma was removed, involving the cæcum and ascending colon.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 110.—CARCINOMA OF SIGMOID. (See Figure 10)

Clinical History.—A woman of 58 complained of constipation. Two years ago she had melæna, since when mucus and bright red blood had been passed at times.

Radiogram.—A filling defect is seen at the rectosigmoid junction (The patient is wearing a pessary.)

Sigmoidoscope.—A polypoid carcinoma, proved microscopically, was seen 14 cm. from the anus.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 111. CARCINOMA PROSTATE. DIVERTICULOSIS. (See Figure 10)

Clinical History.—A man aged 70 had a malignant growth of the prostate for which cystostomy was performed ten months ago.

Screen.—A filling defect was noted in the rectum.

Radiogram (Prone).—Barium enema. Filling defects are present on each side of the rectum. (The suprapubic tube is in position.) The growth has evidently spread from the prostate to the rectum. Diverticula are present from the splenic flexure downwards.

Mr O. A. Marxer. Dr E. I. Spriggs.

FIGURE 108

FIGURE 109

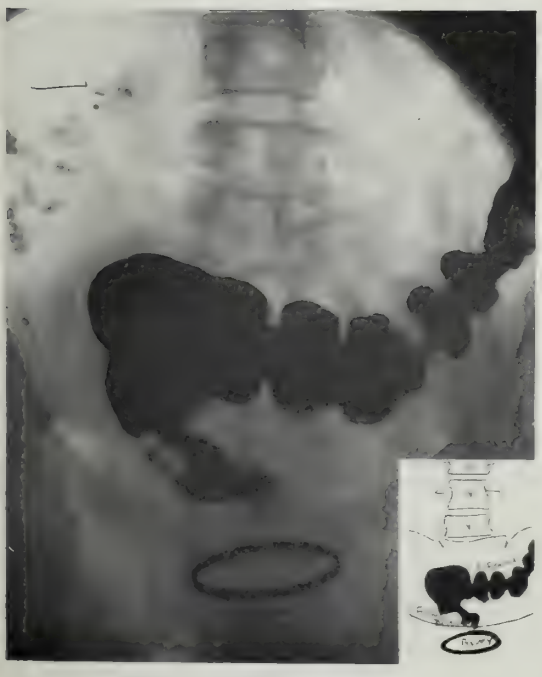


FIGURE 110

FIGURE 111

Figure 112. MALIGNANT TRANSVERSE COLON. (See Figure 10)

History. The first indication of disease was a tumour noted four months ago. It was the size of an orange and freely movable. It moved with respiration, but such movement could be easily restrained without pain. She had no pain, loss of appetite or melæna. There was slight but definite loss of weight.

Screen.—The stomach was hypertonic with some irregularity of outline which disappeared on reclining on the right side. The palpable mass was not the stomach. The irregularity suggested that this organ was pressed on by the tumour. The next day a filling defect was visible in the transverse colon to the left of the middle line. There was some dilatation of the cæcum and proximal parts of the transverse colon. Some obstruction was found in the transverse colon though it was incomplete, some of the opaque meal having reached the sigmoid.

Radiogram.—The picture shows very clearly the mechanical condition caused by the obstruction in the colon, the cæcum and the right side of the transverse colon being distended, whilst the left portion of the descending colon is only slightly filled.

Dr L. A. Rowden.

Figure 113.—CARCINOMA SIGMOID. (See Figure 10)

Clinical History.—The patient had been given medicinal doses of bismuth for six weeks, no doubt on account of diarrhœa. Three enemas were given before the radiogram was taken.

Radiogram.—The fact that the whole of the colon contains bismuth indicates a low obstruction.

Operation.—An annular carcinoma of the sigmoid colon was found.

Dr L. A. Rowden.

Figure 114.—CARCINOMA COLON. (See Figure 10)

Clinical History.—A woman aged 39 had "wind" and pain on the left side which were relieved by food. They came on in attacks lasting a fortnight. She had not lost weight and slept well, when free from pain. Bowels were free.

Screen.—Twelve hours after meal the stomach was empty and food had reached the left side of the transverse colon. Three hours later there had been no progress nor had there been the following day. The colon was the seat of no palpable tumour, it moved freely.

Radiogram.—Shows two breaks in continuity—the one to the left is probably physiological, the other is definitely pathological the result of a stricture. Loss of haustral segmentation.

Operation.—A carcinoma was revealed at the above site; it was excised freely. Two months later symptoms returned, and at operation a simple stricture was found. An anastomosis was performed between the hepatic flexure and the descending colon.

Dr L. A. Rowden.

Figure 115.—CARCINOMA OF SIGMOID. (See Figure 10)

Clinical History.—Since a gastroenterostomy for duodenal ulcer a year ago his bowels had been irregular, he had passed blood and slime. There was discomfort in the lower abdomen.

Screen. The stomach emptied in one hour and the food had reached the cæcum two hours later. After four hours it was in the transverse and upper part of descending colons, the latter was distended and haustral segmentation diminished. The following two days a little was voided per anum together with blood and mucus. A fine line was seen in the lower descending and the sigmoid colons. There appeared to be a double kink in the upper descending colon. The day following this kink was still present in spite of an aperient.

Radiogram. The transverse and upper descending colons are well filled, the latter being dilated. There is an abrupt change in calibre of the descending colon, beyond which the barium appears in isolated masses; a definite break in continuity is seen in the sigmoid.

Result.—Death six weeks later.

Dr L. A. Rowden.

FIGURE 112

FIGURE 113

FIGURE 114

FIGURE 115

Figure 116. CARCINOMA COLON. (See Figure 10)

Radiogram (P.A.).—Opaque meal is seen in the ileum, cæcum and transverse colon, the cæcum being distended. The ascending colon contains traces only, its lumen being occupied by a growth.

Dr L. A. Rowden.

Figure 117.—CARCINOMA OF SIGMOID. (See Figure 10)

Clinical History.—For two years a woman of 49 had experienced attacks of constipation followed by the passage of blood and mucus. Of late pain in the lower abdomen preceded the passage of a motion.

Radiogram.—The opaque enema is arrested at the apex of the sigmoid curve, some 30 cm. from the anus. Above this point the lumen looks jagged. The enema was retained for 8 days.

Operation.—Resection of the tumour, end to end anastomosis and temporary cæcostomy were performed. The tumour was malignant and involved the mesenteric glands. It was two inches in length. She remained well for three years, when recurrence appeared in the stomach.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 118.—TRANSPOSITION VISCERA. (See Figure 10)

Clinical History.—A man aged 41, who had been a chronic dyspeptic all his life, had severe hæmatemesis and melæna five weeks ago.

Screen.—A hypotonic, non-dilated stomach with no pyloric obstruction, which emptied in three hours. The appearance suggested a duodenal ulcer near the pylorus.

Radiogram.—The colon describes a large loop which is almost entirely on the left side, the cæcum and appendix being transposed.

Dr L. A. Rowden.

FIGURE 116

FIGURE 117

FIGURE 118

Figure 119.—DIVERTICULITIS. (See Figure 10)

A man of 56.

Screen.—Fixed irregularity in outline of the sigmoid loop was found.

Radiogram. Note the uniform rigid appearance of the sigmoid colon with small irregularities. This represents the prediverticular stage.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 120.—DIVERTICULITIS. (See Figure 10)

A man of 63.

Screen.—Diverticula were seen; the adjacent bowel walls were hyperactive.

Radiogram. Instead of the usual rounded outline of the saccules, spikes set at varying angles to the lumen are seen.

Remarks. At this period the bowel wall, especially the submucosa, is inflamed and thickened; even the subserous layer. Palpation reveals a tender mass usually in the left iliac fossa which bears a strong clinical resemblance to cancer. The subjects are obese.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 121.—DIVERTICULOSIS. (See Figure 10)

Clinical History. A man complained of constipation and pain in the right iliac fossa.

Radiogram (14 hours after opaque meal). Shows pear-shaped pockets in the transverse colon indicating diverticula. There is ptosis of the whole of the transverse colon.

Remarks.—The limitation of the disease to the transverse colon is unusual.

Dr L. A. Rowden.

Figure 122.—DIVERTICULOSIS. (See Figure 10)

Radiogram (P.A.).—Innumerable pockets of bismuth are apparent in the descending and sigmoid colons. The picture was taken 48 hours after an opaque meal, some time after the administration of a purgative.

N.B.—The outline of both psoas muscles and of the right kidney is clearly visible.

Dr L. A. Rowden.

FIGURE 119

FIGURE 120

FIGURE 121

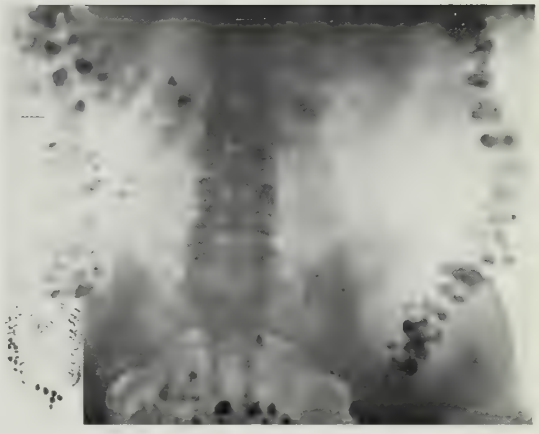


FIGURE 122

Figure 123.—DIVERTICULOSIS. (See Figure 10)

Clinical History. A male aged 69 complained of intermittent pain in the lower abdomen. It was known that he had a kidney stone for ten years. There had been diarrhœa until recently.

Screen.—Multiple diverticula seen.

Radiogram (96 hours). Diverticula are present throughout the colon and cæcum. (Five weeks later some diverticula still contained barium.) A small renal calculus is seen on the left side.

Result. Treatment with paraffin, a bland diet and intestinal douches at low pressure caused the abdominal discomfort to improve greatly.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figures 124–126.—DIVERTICULOSIS. (See Figure 10)

Clinical History.—A woman aged 38 had a child twelve years ago; hysterectomy was performed two years later for hæmorrhage. She suffered from attacks of pain in the left abdomen which were thought to be renal crises. Constipation was marked.

Radiograms.—Figure 124 (Opaque meal 5 days before).—Dotted along the course of the descending colon and sigmoid are pear-shaped beads of barium.

Figure 125 (Barium enema).—Projecting from the gut are numerous pedunculated shadows of barium.

Figure 126.—Shows an identical condition removed post-mortem from a man of 56.

Mr O. A. Marxer. Dr E. I. Spriggs.

FIGURE 123

FIGURE 124

FIGURE 125

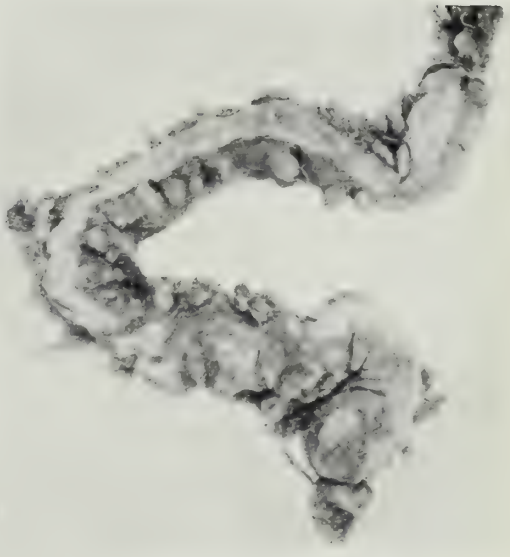


FIGURE 126

Figure 127.—DIAPHRAGMATIC HERNIA. (See Figure 5)

Clinical History.—Five years' pain in the back and over the left lower ribs, flatulence and heartburn formed some of the symptoms of a woman of 58 following a heavy fall.

Screen.—In the posterior mediastinum was an air-space.

Radiogram.—The stomach is divided by a well-marked constriction into an upper part containing gas and streaks of barium, and a lower part containing the meal. Above the gas is seen the œsophagus, which is dilated: a part distorted is also seen lying alongside the stomach in the thorax.

Remarks.—The condition readily explains the symptoms.

N.B.—Same case as Figure 110

Mr O. A. Marxer. Dr E. I. Spriggs.

Case II
Air distended
pyloric
portion of
stomach.
Oesophagus
Diaphragm

FIGURE 127

Figure 128.—DUODENAL ILEUS. (See Figure 5)

Clinical History.—A woman suffered violent epigastric pain which left her abdomen very tender.

Screen.—Stomach normal, meal soon reaching the small intestine. Some barium collected near the gall-bladder. In three hours some meal had reached the transverse and even the descending colon.

Radiogram.—The stomach is full and the duodenum distended with gas.

Remarks.—The cause of the symptoms was probably duodenal ileus (*q.v.*).

Dr L. A. Rowden. Mr L. A. Braithwaite.

Figure 129.—VISCEROPTOSIS. (See Figure 2)

Clinical History.—A man aged 61, a heavy smoker, who had suffered three nervous breakdowns, had complained recently of pain in the epigastrium which disappeared on lying down. He was troubled with flatulence, a nasty taste and constipation. He had lost weight.

Radiogram.—The main part of the meal lies in the pelvis, only streaks of it and gas occupying the upper part of the abdomen.

Remarks.—Since gastric lavage, massage and exercises have been instituted, together with paraffin and an anti-constipation diet, the symptoms have disappeared and he has gained weight.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 130.—VISCEROPTOSIS. (See Figure 3)

Clinical History.—A patient had had epigastric pain coming on after food for some three months. There had been no vomiting or loss of weight.

Screen.—Beyond an obvious ptosis nothing was noted in the stomach, the appendix was normal.

Radiogram.—The main mass of barium lies in the stomach, which is elongated and J-shaped. The duodenum and first part of the jejunum can be identified.

Remarks.—The symptoms were due to visceroptosis, for which a Curtis belt was ordered.

N.B.—Calcification of tips of costal cartilages which may sometimes simulate gall-stones or renal calculi.

Dr L. A. Rowden.

Figure 131.—GASTROPTOSIS. (See Figure 3)

The main mass of barium lies in the pelvis, streaks only are visible in the rest of the stomach, which is filled with gas.

Dr L. A. Rowden.

FIGURE 128

FIGURE 129

FIGURE 130

FIGURE 131

URINARY SYSTEM

FIGURE 132

Figure 132.—NORMAL CYSTOGRAM

Radiogram.—The bladder has been filled with $12\frac{1}{2}$ per cent. sodium bromide in 1 in 3000 mercury perchloride solution.

Dr J. C. Rankin.
Dr R. M. Beath.
Mr R. M. Leman.

Prof. A. Fullerton.

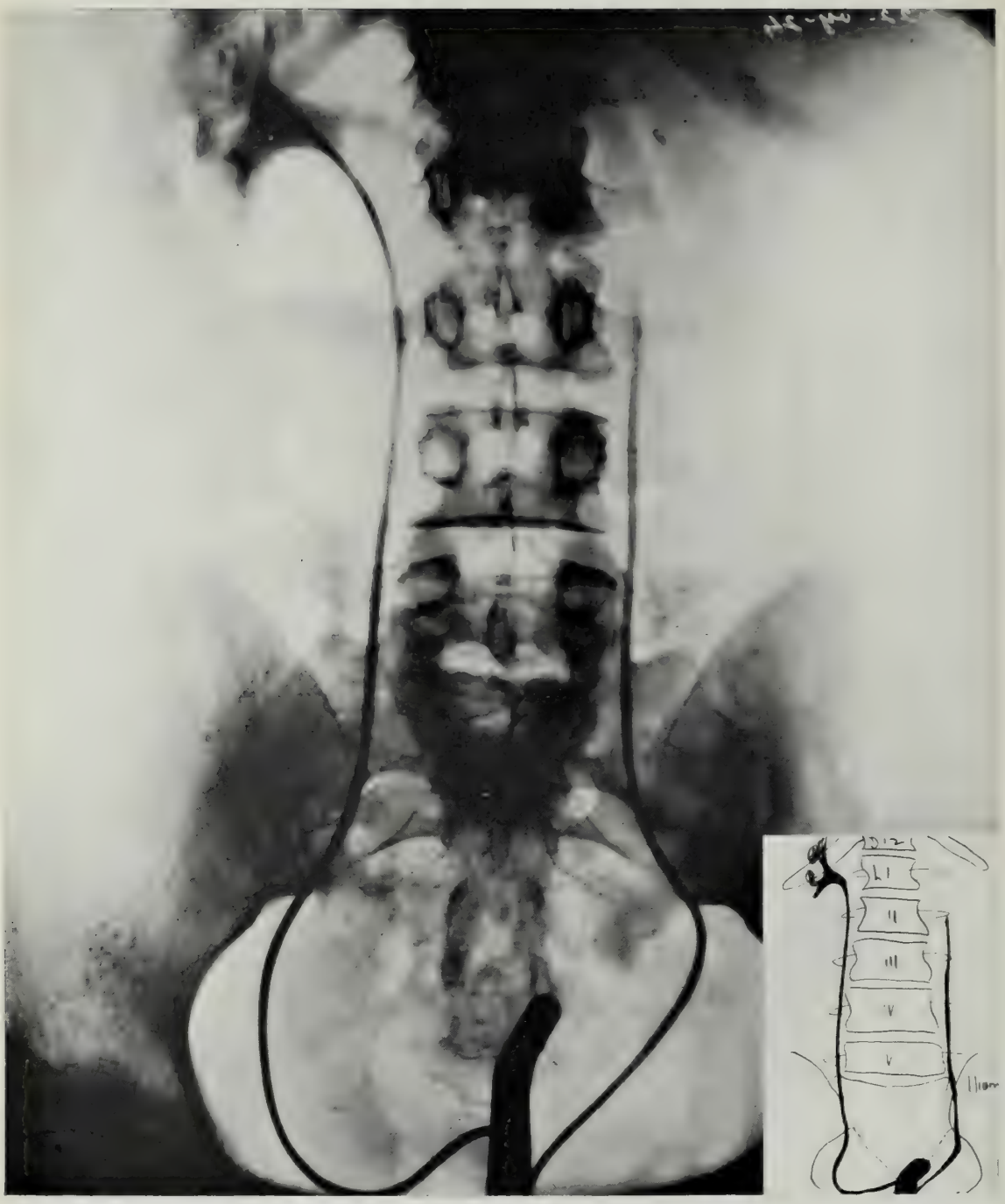


FIGURE 133

Figure 133.—NORMAL URETERS AND PELVIS

Pyelogram.—Shows opaque catheters in position; one renal pelvis contains $12\frac{1}{2}$ per cent. sodium bromide solution.

Dr J. C. Rankin.
Dr R. M. Beath.
Mr R. M. Leman.

Prof. A. Fullerton.

FIGURE 134

FIGURE 135

FIGURE 136

FIGURE 137

Figure 134.—PHLEBOLITH

Radiogram.—A ureteric catheter has been passed via a cystoscope. Two shadows are seen, one on the left just above the pubis; the other, near the iliac spine, is well outside the line of the catheter.

Dr L. A. Rowden.

Figure 135.—NORMAL PYELOGRAM

Pyelogram.—One form of normal renal pelvis, in which the infundibula appear to come off a continuation of the ureter upwards.

Dr J. C. Rankin. Prof. A. Fullerton.
Dr R. M. Beath.
Mr R. M. Leman.

Figures 136 and 137.—CALCIFIED GLANDS (A.P. and P.A.)

Radiograms.—Note that the shadows are denser and larger when viewed in the A.P. position, showing that they are nearer the anterior than the posterior abdominal wall. (*Vide* Differential Diagnosis of Renal Shadows.)

Dr L. A. Rowden.

FIGURE 138

FIGURE 139

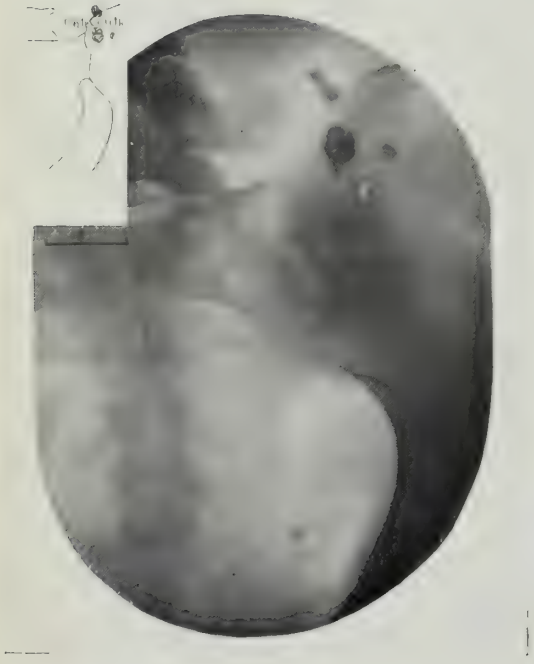


FIGURE 140

FIGURE 141

Figure 138.—REMAINS OF OPAQUE MEAL

These could readily be mistaken for two calculi, one in the bladder, the other in the ureter.

Dr L. A. Rowden.

Figure 139.—PHLEBOLITH

Clinical History.—A man of 43 had had abdominal pain for some time; hæmaturia had occurred twice recently, followed by severe pain.

Screen.—A calculus was visible in the left kidney, right urinary tract normal.

Radiogram.—A phlebolith is seen some distance from the right side of the sacrum.

Operation.—Calculus removed from left kidney.

Remarks.—The danger of ascribing his symptoms to calculus of the right ureter is very obvious, emphasising the need for complete examination of the urinary tract in all doubtful cases.

Dr L. A. Rowden.

Figure 140.—PHLEBOLITHS

Four concretions formed by the calcification of blood clot are seen in the pelvis, and three larger and more irregular ones are visible at the iliac crest.

Dr L. A. Rowden.

Figure 141.—COIN IN SIGMOID

Radiogram.—The mimicry of this and a vesical calculus is marked, though it is above the usual position and eccentric.

Dr L. A. Rowden.

Figure 142.—RENAL CALCULUS

Radiogram.—The left kidney contains a calculus in the form of a cast of the renal pelvis and calyces. Such a shape leaves no doubt in diagnosis. On the right side is an elongated calculus in the upper part of the ureter.

Dr L. A. Rowden.

FIGURE 142

Figure 143.—RENAL CALCULUS

A man of 30.

Radiogram.—Below the last rib is seen a calculus forming a cast of the pelvis, infundibula and calices of the right kidney.

Operation.—A large branching calculus occupied the pelvis and calices, it articulated with others. Nephrectomy was performed, stones the size of a pin's head were found in the lowest calyx.

Dr J. C. Rankin. Prof. A. Fullerton.
Dr R. M. Beath.
Mr R. M. Leman.

Figure 144.—RENAL CALCULUS AND SAND

Radiogram.—The kidney outline is seen near the iliac crest and above the last rib, indicating enlargement and not ptosis. In the upper part of the pelvis is an oxalate calculus, whilst in the lower part of the kidney is "sand."

Remarks.—The cause of the enlargement is not obvious, the calculus not being in a position to cause hydronephrosis.

Dr L. A. Rowden.

Figure 145.—RENAL CALCULUS

Clinical History. A man aged 46 had had a renal calculus removed four years ago and now had a return of symptoms.

Radiogram.—Shows a stone opposite the tip of the transverse process of the second lumbar vertebra, indicating its position in the renal pelvis. Its centre and periphery are separated by an intervening light zone.

Operation.—A calculus was found in the renal pelvis.

Remarks.—The stone may have originated independently or may have been formed round a fragment of the first calculus.

Dr L. A. Rowden.

Figure 146.—RENAL CALCULUS

Clinical History.—A multipara of 35 had suffered from hæmaturia since a miscarriage five and a half years ago. Until five months ago she had no pain, but it had now developed in the left loin, radiating to the front.

Radiogram (A.P.).—A large oval calculus of no great density is visible opposite the first lumbar disc—*i.e.* the position of the renal pelvis.

Operation.—A friable calculus was removed from the left renal pelvis.

Dr L. A. Rowden.

FIGURE 143

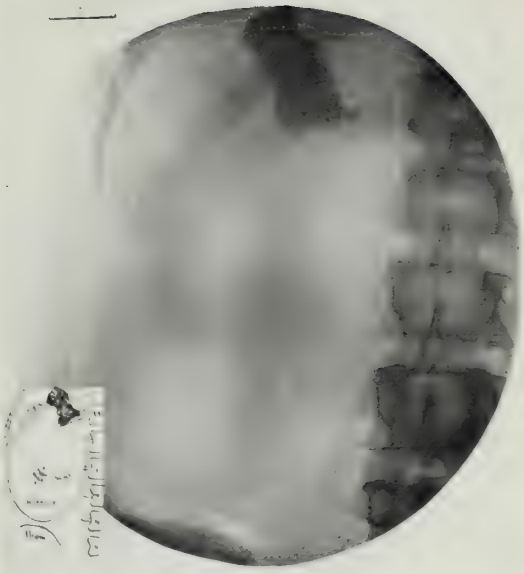


FIGURE 144

FIGURE 145

FIGURE 146

Figure 147.—RENAL CALCULUS

Clinical History.—A male aged 23 had attacks of pain once a month, associated with constipation. There had been some hæmaturia.

Radiogram.—An oval stone lies in the kidney just below the last rib, probably consisting largely of oxalate.

Dr L. A. Rowden.

Figure 148.—RENAL CALCULUS

Clinical History.—A multipara, aged 66, had had pain in the right loin, groin and leg for eight days. There was a palpable kidney swelling.

Radiogram.—An irregularly rectangular stone bearing two projections is present; the low position implies some ptosis of the organ.

Dr L. A. Rowden.

Figure 149.—RENAL CALCULI

Radiogram.—Three calculi are seen. One less dense than the others occupies the renal pelvis, whilst the lowest one shows a characteristic laminated appearance.

Dr L. A. Rowden.

Figure 150.—RENAL CALCULUS

Clinical History.—A man aged 33 had had a large calculus removed previously.

Radiogram.—A dense shadow is seen just beneath the last rib; several minute calculi—sand—are seen.

Remarks.—The density suggests an oxalate constitution.

Dr L. A. Rowden.

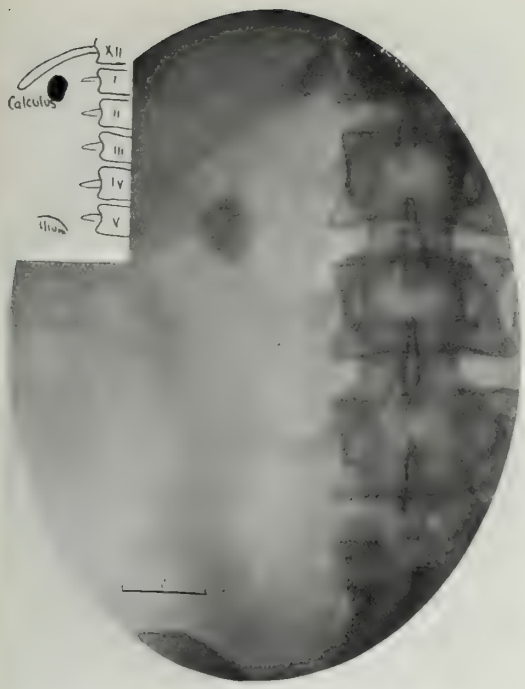


FIGURE 147

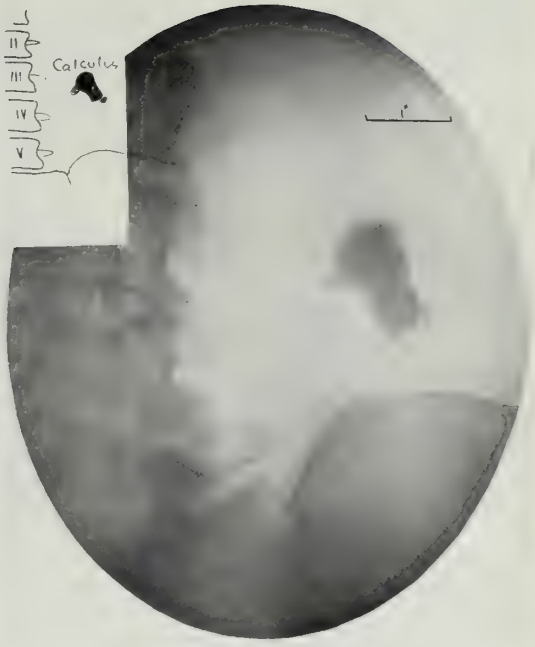


FIGURE 148

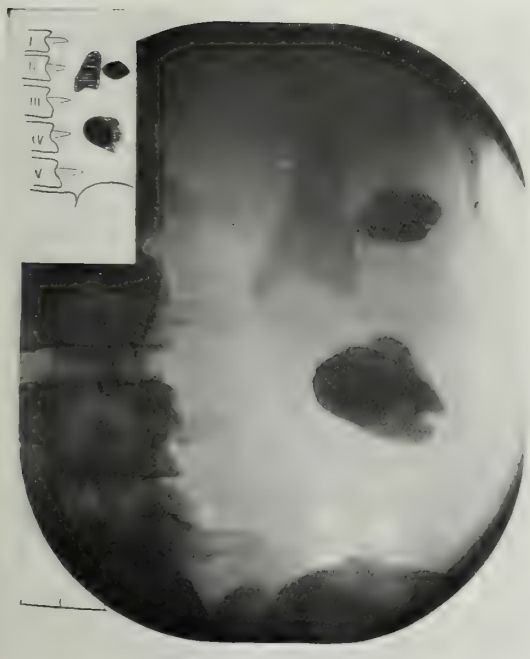


FIGURE 149

FIGURE 150

Figure 151.– BILATERAL RENAL CALCULI

Radiogram. Each kidney contains an enormous stone, the right also containing two small ones.

Dr L. A. Rowden.

Figure 152.—RENAL CALCULUS

Clinical History. There were mild symptoms of stone in the kidney.

Radiogram.– A calculus is seen forming a cast of the renal pelvis. The kidney shadow is larger than normal.

Dr E. W. H. Shenton.

Figure 153.—TUBERCULOUS KIDNEY

Radiogram.– The kidney has been replaced by a mottled mass of caseous material, impregnated with calcium.

Dr L. A. Rowden.

FIGURE 151

FIGURE 152

FIGURE 153

Figures 154 and 155. HYDRONEPHROSIS. (See Figure 133)

Radiogram. On the left side are seen two irregular calculi obviously in the renal pelvis by their shape. On the right side are three calculi in the position of the ureter, one being at the sacro-iliac synchondrosis, the others opposite the iliac spines.

Pyelogram. A large hydronephrosis is seen on the right side caused by stones in the ureter. Two small calculi occupy the dilated pelvis at the level of the iliac crest.

Result. As the patient was suffering from renal insufficiency and was unsuitable for operation death took place from uræmia.

Dr J. C. Rankin. Prof. A. Fullerton.
Dr R. M. Beath.
Mr R. M. Leman.

Figure 156.—HYDRONEPHROSIS. (See Figure 133)

Clinical History.—For six years a boy of 12 had complained of left lumbar pain.

Pyelogram. The pelvis of the kidney is large and shows no calyces, implying expansion at the expense of the pelvis rather than destruction of the renal tissue.

Operation. On exploration the pelvis was found to be the size of a hen's egg. An accessory renal artery was found passing from the aorta to the lower pole of the kidney in front of the upper end of the ureter. The artery was divided between ligatures with complete relief of pain.

Dr J. C. Rankin. Prof. A. Fullerton.
Dr R. M. Beath.
Mr R. M. Leman.

Figure 157. HYDRONEPHROSIS. (See Figure 133)

Clinical History.—A woman of 50 had complained of pain in the loin for several years. The pain radiated from the loin to the groin. Hæmaturia occurred two years ago.

Radiogram.—The outline of the kidney is visible. A triangular dense stone occupies the renal pelvis, forming a rough cast of it. A small round calculus is seen at the origin of the ureter. Two groups of stones occupy other parts of the kidney.

Remarks.—The normal position of the pelvis and the low position of one group of stones in themselves imply enlargement. This is undoubtedly due to hydronephrosis caused by the ureteric stone.

Dr L. A. Rowden.

FIGURE 154

FIGURE 155

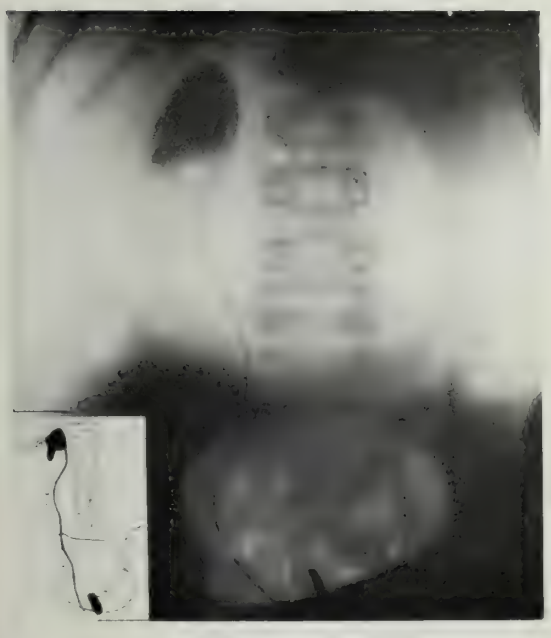


FIGURE 156

FIGURE 157

Figure 158.—MOVABLE KIDNEY. (See Figure 133)

Clinical History. A woman had experienced Dietl's crises, with pain on the right side for several years.

Pyelogram.—The pelvis is very low and the ureter "cork screwed."

Operation. The organ was anchored in position, with the result that she has had no attacks during the last three years.

Mr F. Kidd.

Figure 159.—DOUBLE KIDNEY. (See Figure 133)

Clinical History. For seven years this condition occasioned a woman several attacks of renal colic on the right side.

Cystoscopy. Two ureters were seen on the right side and one on the left: catheters were passed up all. Deep indigo carmine came from the left kidney and right lower one eight minutes after intramuscular injection: none appeared from the right upper kidney in half-an-hour.

Mr F. Kidd.

Figure 160.—CONGENITAL CYSTIC KIDNEY. (See Figure 133)

Pyelogram. The pelvis occupies a low position and is greatly distorted.

Dr J. C. Rankin. Prof. A. Fullerton.
Dr R. M. Beath.
Mr R. M. Leman.

Figure 161.—HYDRONEPHROSIS. (See Figure 133)

Clinical History.—For two years a man of 29 had attacks of hæmaturia and renal colic on the left side.

Pyelogram.—Two interruptions in the opaque injection are seen, the pelvis is distended.

Operation.—The broad interruption proved to be due to an abnormal renal artery: it was divided. The dilated portion below was an S-shaped kink, for which a plastic operation was performed.

Result.—No return of symptoms has occurred during subsequent five years.

Mr F. Kidd.

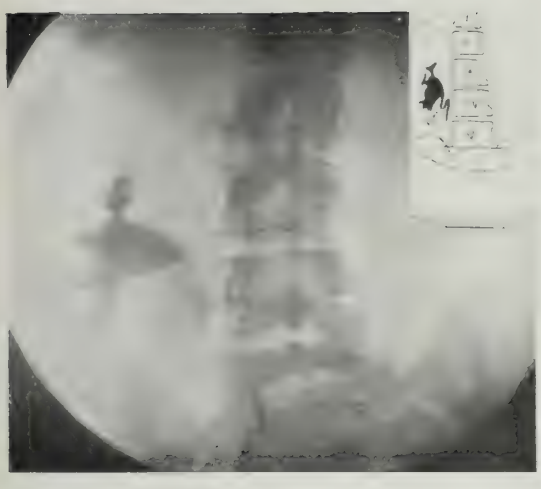


FIGURE 158

FIGURE 159

FIGURE 160

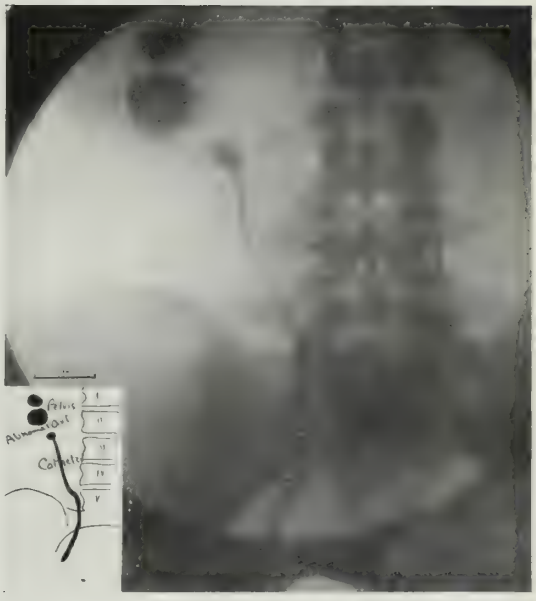


FIGURE 161

Figures 162 and 163.—MOVABLE KIDNEY. (See Figure 133)

Clinical History. A patient had severe attacks of renal colic, radiating to the inguinal region and urethra.

Pyelogram (On admission).- Figure 159.—The kidney has dropped, the ureteric origin being opposite III. The commencement of the ureter shows a well-marked twist.

Operation.—The kidney was fixed to the external arcuate ligament.

Pyelogram (After operation).—Figure 160.—Note the high position of the origin of the ureter and the undoing of its kink.

Result.—Complete relief of symptoms.

Dr J. C. Rankin. Prof. A. Fullerton.
Dr R. M. Beath.
Mr R. M. Leman.

Figure 164.—MOVABLE KIDNEY

Clinical History.—A woman, who had no children, suffered pain in the left loin and frequency for a year.

Radiogram (P.A.).— The renal shadow is clearly seen extending from within an inch of the ilium to the level of the first lumbar vertebra. The shadow above the kidney is probably the spleen.

Dr L. A. Rowden.

Figure 165.—MOVABLE KIDNEY. (See Figures 133 and 135)

Clinical History.—A patient had renal pain for some time.

Pyelogram.—The pelvis joins the ureter at right angles; the former occupies a low position.

Operation.—The acute bend was found to be due to rotation of kidney. Fixation of the kidney in the normal position—*i.e.* with its upper pole directed upwards and inwards instead of directly upwards—gave complete relief.

Dr J. C. Rankin. Prof. A. Fullerton.
Dr R. M. Beath.
Mr R. M. Leman.

FIGURE 162

FIGURE 163

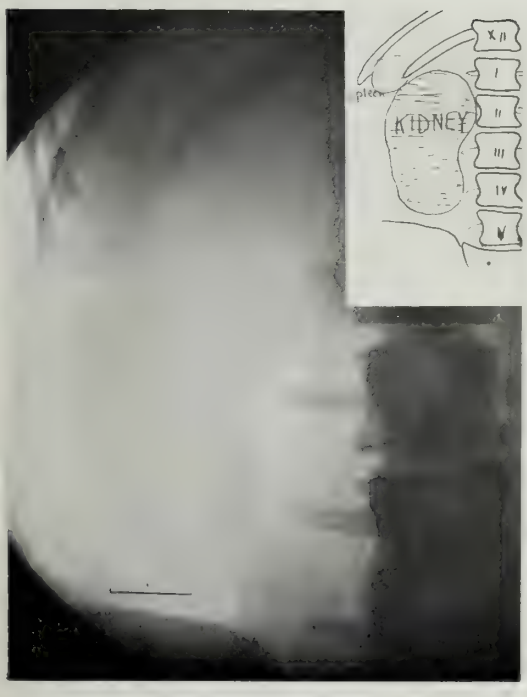


FIGURE 164

FIGURE 165

Figure 166.—TUBERCULOUS KIDNEY. (See Figure 133)

Pyelogram.—The ballooning of the upper calices is well seen: the pyramids are probably eroded.

Operation.—A tuberculous abscess one inch in diameter, with thick walls in the cortex, not communicating with the pelvis, was found. The infundibula and calyces were dilated. Groups of tubercles were seen on the renal surface; the ureter was thickened.

Dr J. C. Rankin.
Dr R. M. Beath.
Mr R. M. Leman.

Prof. A. Fullerton.

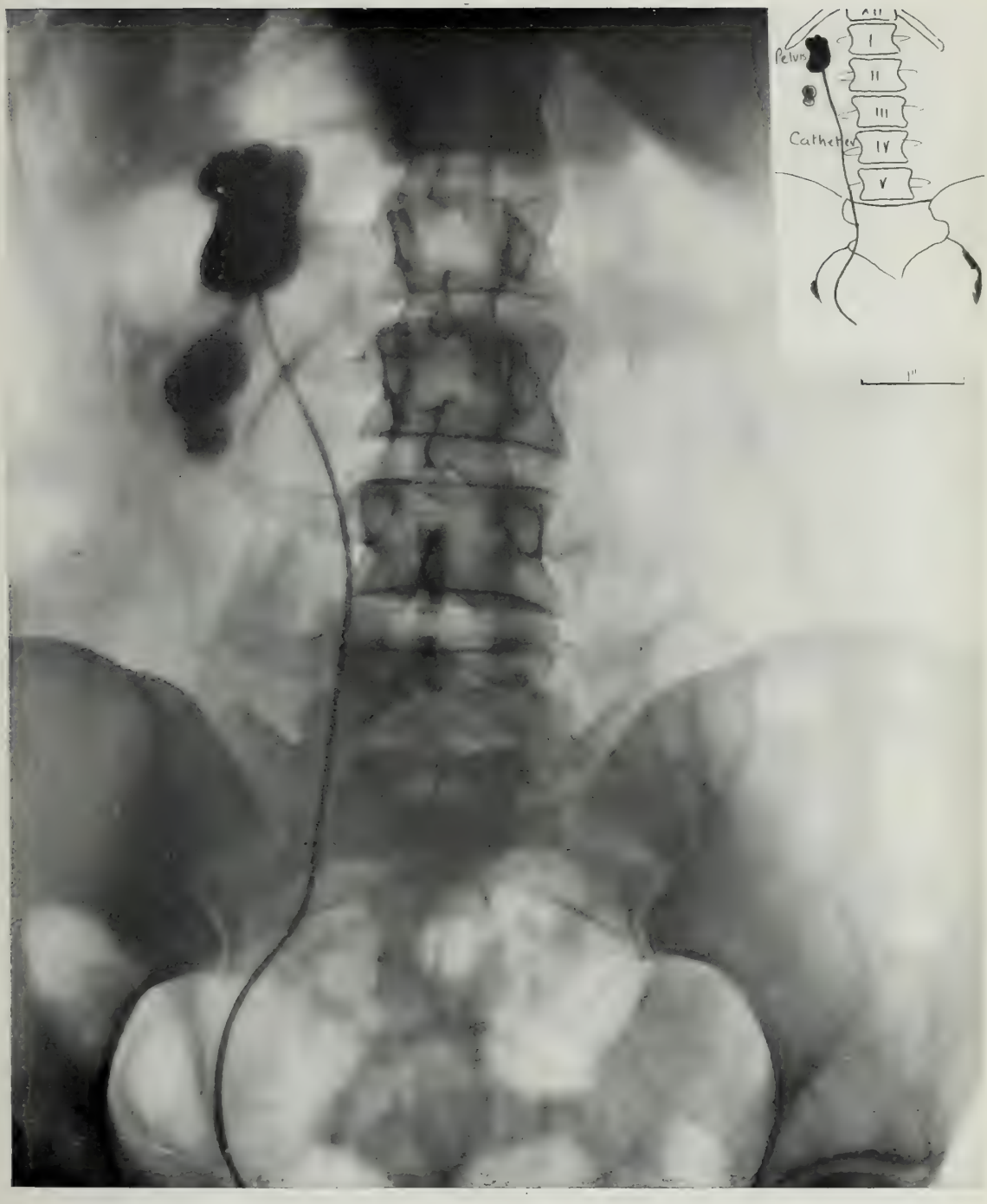


FIGURE 166

Figure 167.—URETRAL CALCULUS

Radiogram. At the left lateral border of the sacrum is seen the shadow of a calculus which is in the lowest part of the ureter. Its periphery is darker than its centre, which is probably uric acid.

Dr L. A. Rowden.

FIGURE 167

Figure 168.—URETRAL CALCULI

Clinical History.— A woman of 62 had had a vesical calculus removed three years ago. She had one attack of colic a year later and one two months ago; otherwise she had been well.

Radiogram.—Two large calculi are seen in the lower end of the ureter, the larger one being elongated.

Dr L. A. Rowden. Mr C. B. Paul.

Figure 169.—URETRAL CALCULI. (See Figure 133)

Radiogram.—The opaque catheter is seen to be arrested by two pea-like calculi lying near the sacro-iliac articulation.

Dr J. C. Rankin. Prof. A. Fullerton.
Dr R. M. Beath.
Mr R. M. Leman.

Figure 170.—URETRAL CALCULUS

Clinical History.—A man of 44 had been passing gravel for a year—two years ago—since when he had been free until now. He had now been suffering from colic for four days.

Radiogram.—An irregular calculus is seen in the pelvic ureter. Its nucleus is denser than its periphery.

Operation.—A calculus was removed $\frac{1}{2}$ in. from the bladder.

Remarks.—The centre of the stone is probably oxalate, the periphery phosphate.

Dr L. A. Rowden.

Figure 171.—URETRAL CALCULI

Radiogram.—Three shadows are seen, two on the right side opposite the tips of the transverse processes of the fourth and fifth lumbar vertebræ, one on the left opposite the fourth vertebræ. The outline of the psoas is clearly seen.

Remarks.—Their date-stone shape and relation to the vertebræ indicate that they are in the ureter.

Dr L. A. Rowden.

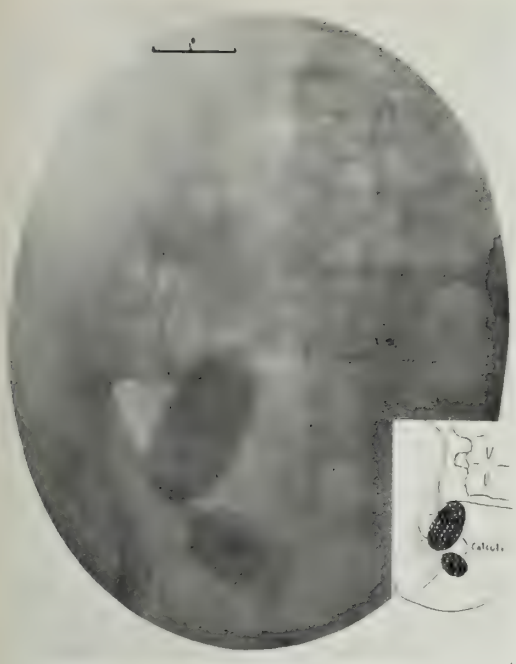


FIGURE 168

FIGURE 169

FIGURE 170

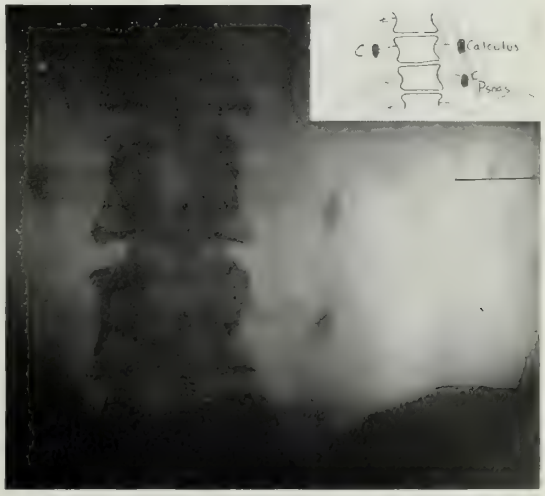


FIGURE 171

Figure 172.—VESICAL CALCULUS

Clinical History.—A patient, who weighed 21 st., had bladder symptoms.

Radiogram.—A large oval shadow of slight density is seen above the symphysis pubis, composed probably of phosphates.

Operation.—The stone removed weighed 7 oz., its dimensions being $9\frac{1}{4}$ by $8\frac{1}{2}$ by $6\frac{1}{4}$ in.

Dr L. A. Rowden.

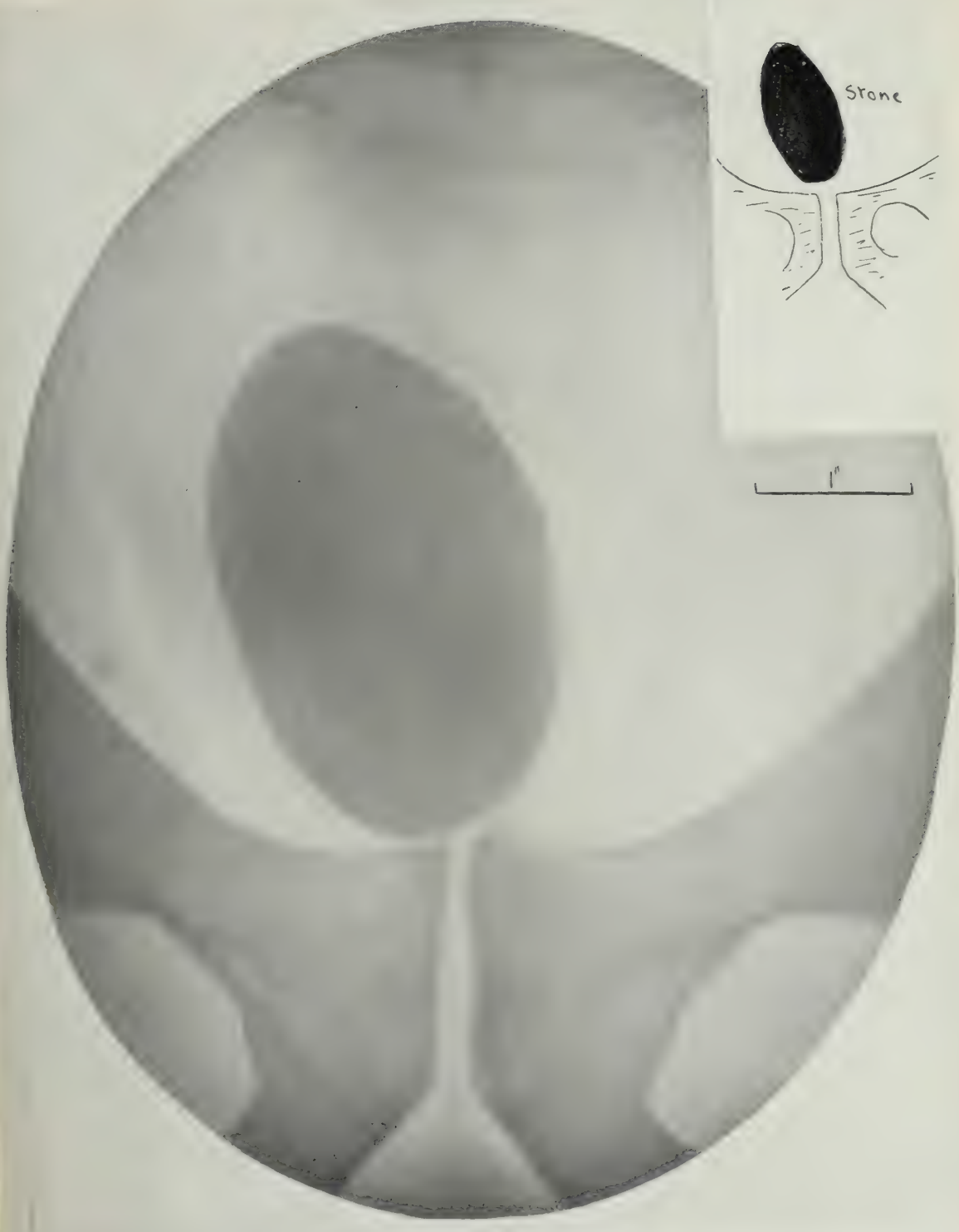


FIGURE 172

Figure 173.—VESICAL CALCULUS

Clinical History.—For a year a man aged 48 had difficulty and pain in passing urine. The stream was slow, retention occurred periodically. No stricture and prostatic enlargement or nervous disease was present.

Radiogram.—A large oval calculus is seen well above the symphysis pubis. It contains a dark nucleus encrusted by a layer of phosphates.

Operation.—Since lithotrity was done he has been free from symptoms for these three years.

Mr F. Kidd.

Figure 174.—VESICAL CALCULUS

Clinical History.— There were all the symptoms of vesical irritation.

Radiogram.—A hair-pin is seen round the closed end of which a calculus has formed.

Operation.—The stone was removed suprapubically.

Dr E. W. H. Shenton.

Figure 175.—VESICAL CALCULI

Radiogram.—Three well-marked oval calculi are seen above the symphysis pubis.

Dr L. A. Rowden.

Figure 176.—VESICAL CALCULUS

Radiogram.—A round uniform calculus is apparent, to the right above the pubes.

Dr L. A. Rowden.

FIGURE 173

FIGURE 174

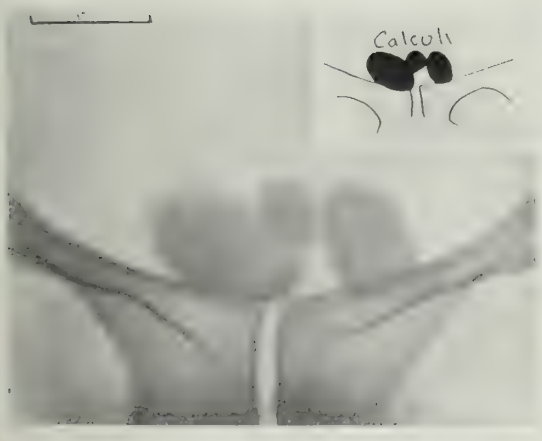


FIGURE 175

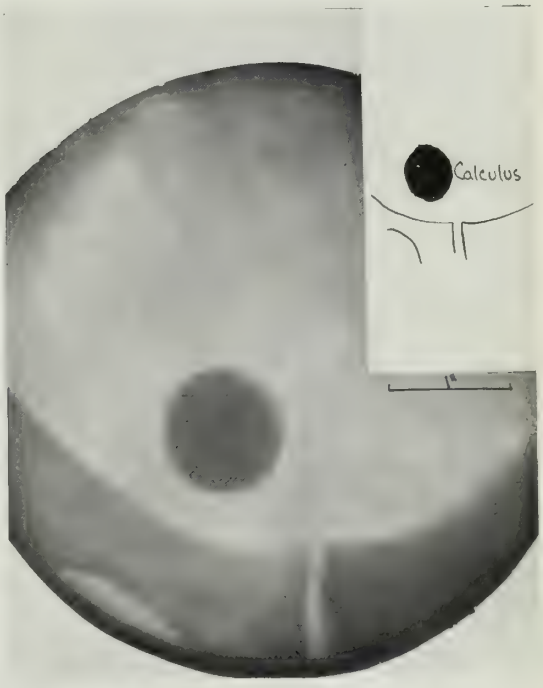


FIGURE 176

Figure 177.—CARCINOMA BLADDER. (See Figure 132)

Cystogram.—The right side of the bladder is flattened, due to what proved to be a carcinomatous ulcer. The ureteric sphincter has been destroyed, allowing the sodium bromide to pass up the ureter.

Operation.—A carcinomatous ulcer, 2 in. across, was found, which just reached the opening of the ureter. The right half of the bladder and the ureter were removed, the latter being implanted into the opposite half of the former.

Dr J. C. Rankin.
Dr R. M. Beath.
Mr R. M. Leman.

Prof. A. Fullerton.

FIGURE 177

Figure 178.—PROSTATIC AND URETHRAL CALCULI

Clinical History.—A man aged 43 had symptoms of vesical calculus. He had passed no blood, but there had been gravel.

Radiogram.—Shows a number of small calculi around the upper part of the symphysis pubis. There is a large, irregular stone in the membranous portion of the urethra.

Operation.—The urethral calculus was removed.

Dr L. A. Rowden.

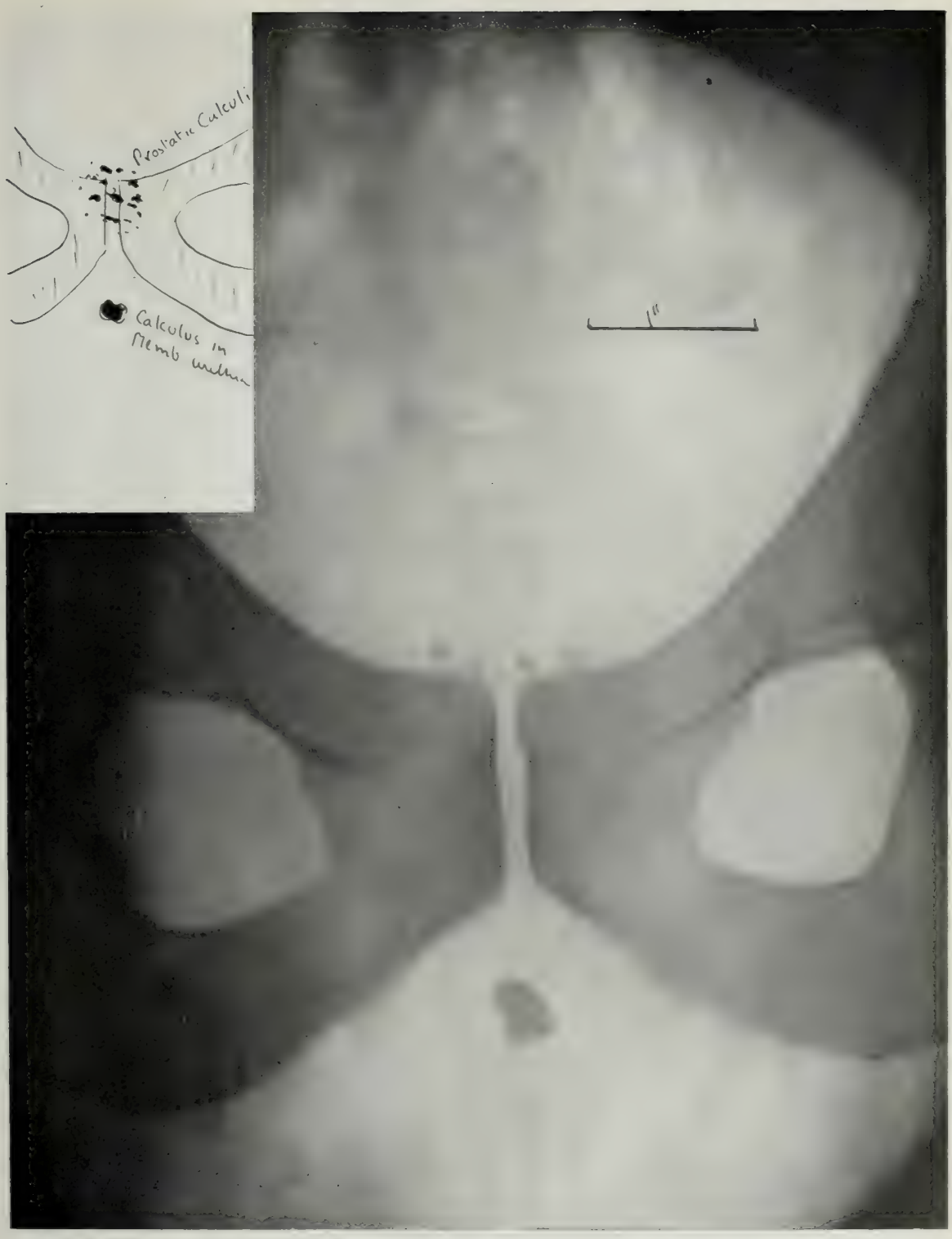


FIGURE 178

Figure 179.—VESICAL POUCHES. (See Figure 132)

Clinical History.—A man of 61 had suffered pain for several years. He had hæmaturia and pyuria. A stricture had been divided.

Cystogram (Silver Iodide Emulsion).—Three pouches are present, evidently due to back pressure. The prostate contains many calculi, whilst several phleboliths are present.

Mr F. Kidd.

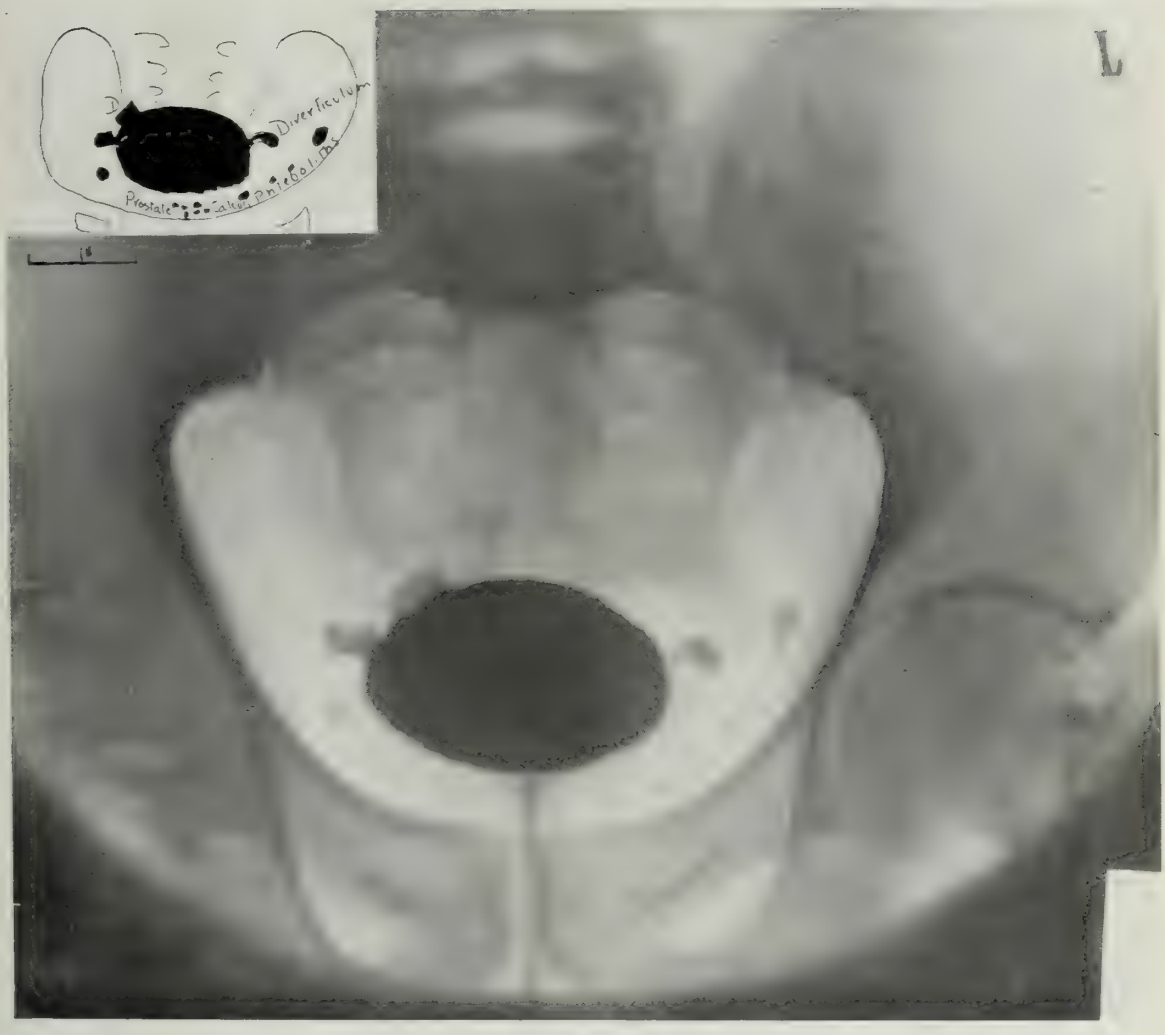


FIGURE 179

Figure 180.—FOREIGN BODY IN BLADDER

A married woman of 23.

Radiogram. Shows a hair-pin above the pubis: round the hinged, closed end a stone has formed.

Operation.—The stone was crushed with a lithotrite, thus freeing the hair-pin, which was seized and removed by the forceps of an operating cystoscope.

Dr J. C. Rankin. Prof. A. Fullerton.
Dr R. M. Beath.
Mr R. M. Leman.

Figure 181.—PIN IN PROSTATE

Clinical History.—A vesical stone containing four pins had been removed previously.

Radiogram.—Shows a pin embedded vertically in the prostate.

Dr L. A. Rowden.

Figure 182.—URETHRAL CALCULUS

Radiogram.—A stone is seen below the symphysis pubis in a child about 10 years old.

Remarks.—Calculus must always be considered in cases of retention in boys.

Dr L. A. Rowden.

Figure 183.—PENILE CALCULUS

Radiogram.—A large, oval calculus is seen impacted in the urethra in the fossa navicularis—*i.e.* the narrowest part of the tube. It is fractured.

Remarks.—Such are readily extracted with forceps, with or without a small dorsal incision into the meatus.

Dr L. A. Rowden.

FIGURE 180

FIGURE 181

FIGURE 182

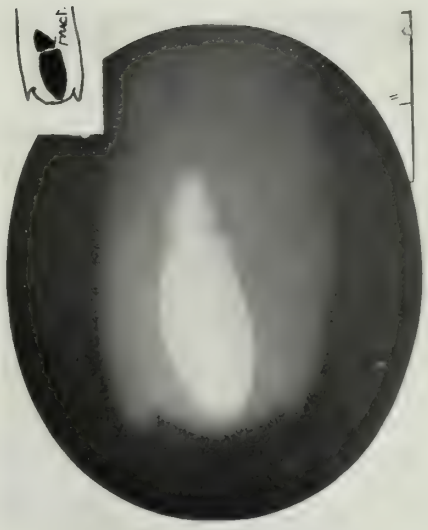


FIGURE 183

RESPIRATORY SYSTEM

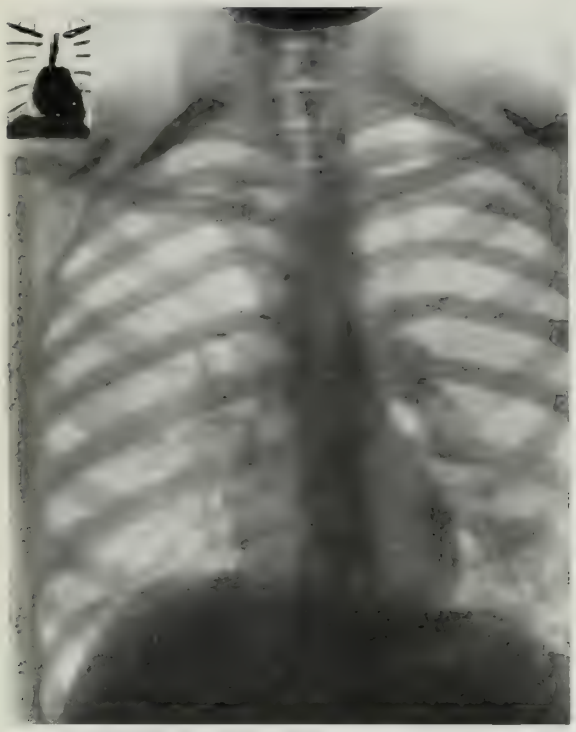


FIGURE 184

FIGURE 185

Figure 184.—NORMAL CHEST. (Age 15)

Radiogram.—Normal appearance of a chest.

Dr T. I. Candy.

Figure 185.—NORMAL CHEST. (Age 30)

Radiogram.—Note the great increase in density of the bronchial tree and lung generally, compared with Figure 184. Some anthracosis is present.

Dr T. I. Candy.

FIGURE 186

Figure 186.—NORMAL CHEST

A man of 32.

Screen.—Equal and free movement of both sides of diaphragm: lighting up was good.

Radiogram.—The root shadows are well defined and show denser circular gland areas. From each hilum fine, well-defined lines radiate into the lobes; on some of these lines nodular thickenings are found. The striations extending towards the base are somewhat denser than normal.

N.B.—This patient was radiographed fifteen years ago, and has not suffered since from any pulmonary disease.

Vale of Clwyd Sanatorium. Mr H. Morriston Davies.

FIGURE 187

Figure 187.—NORMAL CHEST. (Age 22)

Radiogram.—The bronchial tree is very beautifully seen.

Dr T. I. Candy.

Figure 188. -ACTIVE TUBERCULOSIS. (See Figure 187)

Clinical History.– The onset occurred four months ago. His general condition was poor, there being pyrexia and cough. Active disease was present in the whole of the right lung and the middle third of the left. Tubercle bacilli were found in the sputum.

Screen.—The diaphragm moved well.

Radiogram. – A dense, woolly deposit is present in the upper two-thirds of the right lung and the middle third of the left. Near the hilum on the left side and some distance from it on the right are small cavities. The heart is large, but not displaced.

N.B.– This film was inadvertently printed on the wrong side.

Tor-na-Dee Sanatorium. Dr J. M. Johnston.

FIGURE 188

Figure 189. ARRESTED TUBERCULOSIS. (See Figure 187)

Same case as Figure 188, ten months later.

Clinical History.—General condition was now good. There were crackling rales on the right side but no tubercle bacilli were found.

Radiogram.—The mottled areas seen in Figure 188 have shrunk in size, due to fibrosis. Any small cavities present are surrounded by a ring of fibrosis.

Tor-na-Dee Sanatorium. Dr J. M. Johnston.

FIGURE 189

Figure 190.—PLEURAL EFFUSION. (See Figure 187)

Radiogram. The left lung is shrunken and the mediastinum has been drawn to the left and is fixed by adhesions. The pleural effusion is of later development.

Vale of Clwyd Sanatorium. Mr H. Morriston Davies.

Figure 191.—PYO-PNEUMOTHORAX. (See Figure 187)

Later stage of Figure 190.

Radiogram. Part of the fluid had been replaced by air; the upper level of the effusion shows as a horizontal line.

Vale of Clwyd Sanatorium. Mr H. Morriston Davies.

Figure 192. PNEUMOTHORAX, PARTIAL. (See Figure 186)

Clinical History.— Pneumothorax was performed on the left side and the phrenic nerve evulsed.

Radiogram.—The outline of the lung is visible.

Vale of Clwyd Sanatorium. Mr H. Morriston Davies.

Figure 193.—ARTIFICIAL PNEUMOTHORAX. (See Figure 187)

Radiogram.—A partial pneumothorax has been obtained on the left side—which was the side first attempted. (A very incomplete one has been accomplished on the right; the lung is seen partially retracted towards the mediastinum.)

Vale of Clwyd Sanatorium. Mr H. Morriston Davies.

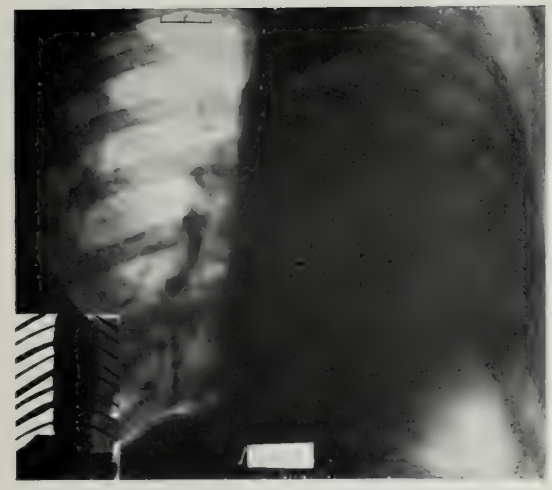


FIGURE 190

FIGURE 191

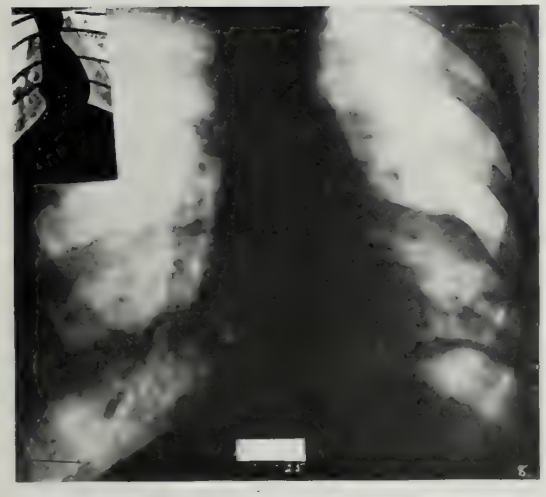


FIGURE 192

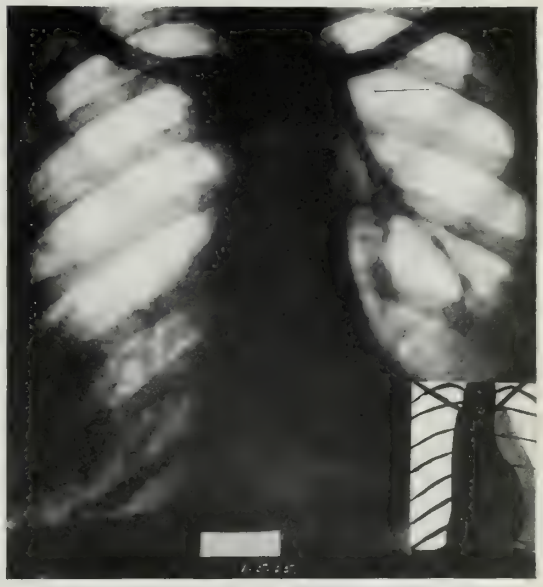


FIGURE 193

Figure 194. RECURRENT TUBERCULOSIS. (See Figure 186)

Clinical History. The present attack began last month. There was a history of tuberculous infection in childhood. Cough, night sweats and fever were present, he had lost weight. Tubercle bacilli were not found. Wassermann and Widal reactions were negative. Clinical signs indicated infiltration of the right upper lobe, a few rales being heard below the clavicle. A relative lymphocytosis was present.

Screen.—The diaphragm moved freely and uniformly.

Radiogram. The whole of the right lung has a slight ground-glass appearance compared with the left. Root shadows are denser than usual, their density suggesting calcification. A calcareous node is visible above the left clavicle.

Tor-na-Dee Sanatorium. Dr J. M. Johnston.

Figure 195.—ADVANCED TUBERCULOSIS. (See Figure 186)

Clinical History.—Symptoms commenced three years ago and by now his general condition was poor, severe toxæmia being present. The abdomen was affected. There was widespread disease of both lungs with emphysema and cavities in both upper lobes.

Screen.—Restricted movement of the diaphragm on both sides was observed.

Radiogram. There is extensive infiltration of the upper two-thirds of both lungs with thickened cavities opposite the right clavicle, above and below the left one. The diaphragm is high and the heart well shaped and central.

Tor-na-Dee Sanatorium. Dr J. M. Johnston.

Figure 196.—NATURAL PNEUMOTHORAX. (See Figure 186)

Clinical History. A patient was admitted on account of sudden shortness of breath and symptoms suggesting pneumothorax.

Radiogram. Air is found filling the pleural cavity, the lung has shrunk towards the mediastinum.

Operation.—Under X-rays the chest was aspirated, when the lung expanded rapidly.

Result.—The patient was immediately relieved, and has since remained well. The cause is very obscure.

Dr E. W. H. Shenton.

Figure 197.—PLEURAL EFFUSION. (See Figure 187)

Radiogram.—The upper edge of a collection of fluid is apparent on the left side. The angle between the diaphragm and chest wall is greatly increased. Some silicosis is present.

Dr L. A. Rowden.

FIGURE 194

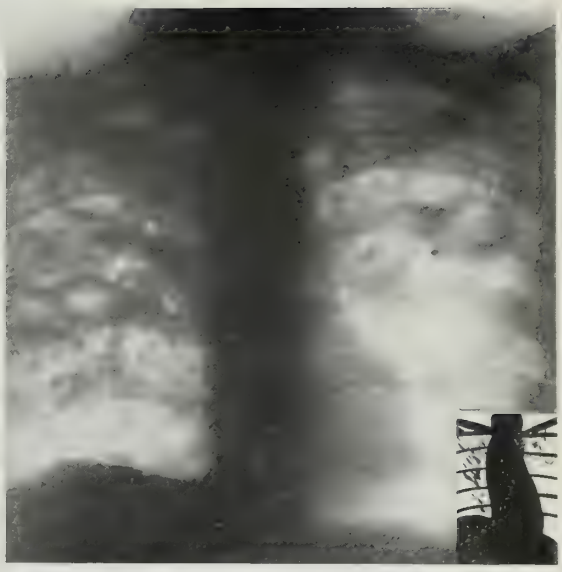


FIGURE 195

FIGURE 196

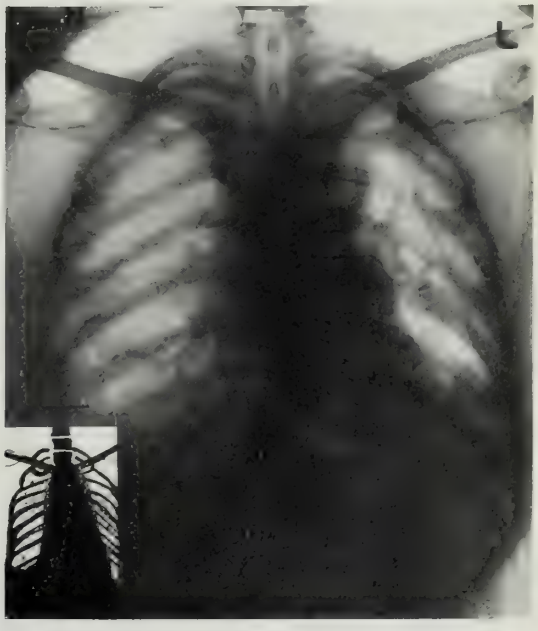


FIGURE 197

Figure 198.—LOBAR BRONCHIECTASIS. (See Figure 186)

A female of 18.

Radiogram. Cavities filled with secretion are apparent throughout the basal portion of the right lower lobe. The shadow of the hilum is larger than normal, due probably to irritation of overflowing secretion. The condition is more acute than Figure 199: there is considerable cardiac displacement and falling in of the chest wall.

Vale of Clwyd Sanatorium. Mr H. Morriston Davies.

Figure 199.—BRONCHIECTASIS. (See Figure 186)

Clinical History.— A woman of 21 gave a history of long-standing cough and expectoration following pneumonia.

Screen.—The outer half of the right side of the diaphragm moved well, but not the inner, whilst the left was almost immobile.

Radiogram.—The inner and lower part of the left lung is opaque, due to the fibrosis and displacement of the heart, whilst the outer part is less obscure, due partly to this being less diseased. Although the opacity does not involve the upper lobe its texture has disappeared. The right diaphragm is flattened laterally and shows angular deformity.

Scoliosis is present, approximating the ribs on the left side. The heart is drawn over, exposing the vertebræ to the left of which appears the tracheal streak.

Remarks.—The ground-glass appearance of the affected lung is very characteristic.

Vale of Clwyd Sanatorium. Mr H. Morriston Davies.

FIGURE 198

FIGURE 199

Figure 200.—ACUTE PNEUMONIA. (See Figure 185)

A boy of 10.

Screen (third day after onset).—The right side of the diaphragm moved well, but the left was almost immobile.

Radiogram.—A homogeneous opacity, less dense than the diaphragm, is seen in the left lobe. The heart is drawn slightly to the affected side.

Vale of Clwyd Sanatorium. Mr H. Morriston Davies.

Figure 201.—EMPYEMA—OLD. (See Figure 187)

Clinical History.— 40 years previously the patient had an attack of acute pain in the chest, which disappeared on blistering and painting with iodine. Though suffering from severe dyspnœa she was able to work until now.

Radiogram.—The left chest cavity is greatly diminished, having the mediastinum drawn towards it. The left lung is about a quarter the size of the right and is covered by a cap of thickened pleura. There are multiple small opacities throughout. On the inner aspect is a very dense area, tapering to a point above; this is probably a localised collection of inspissated pus.

Vale of Clwyd Sanatorium. Mr H. Morriston Davies.

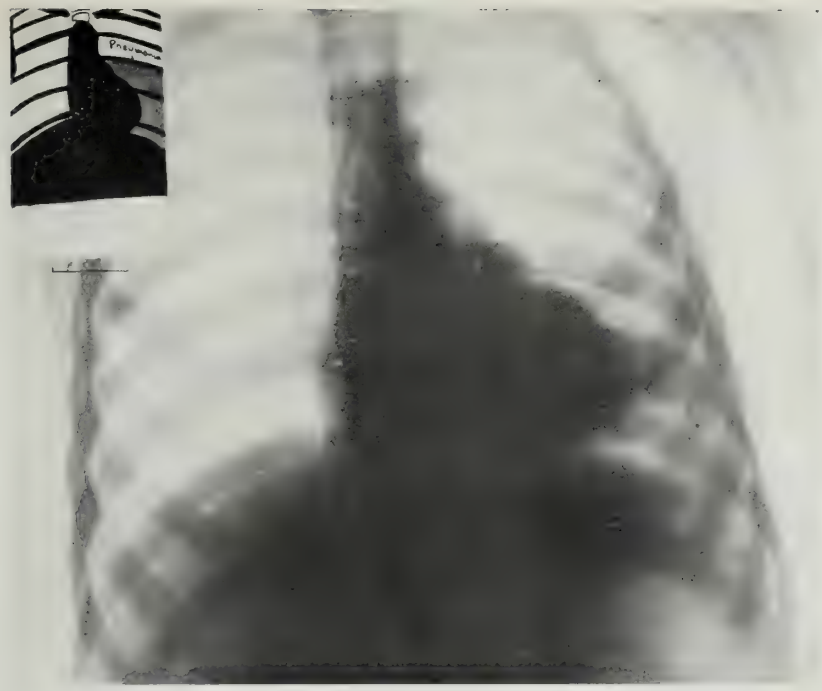


FIGURE 200

FIGURE 201

Figures 202–204.—PNEUMOTHORAX. (See Figure 186)

Clinical History.— Symptoms began four years ago. There was continuous pyrexia : repeated hæmoptysis had occurred. Active disease was present in the right lung and tubercle bacilli were found. An artificial pneumothorax done two years ago resulted in the toxæmia disappearing ; good collapse was obtained save at the apex. She has been at work continuously since.

Radiograms.— Figure 202 (On admission).—A small amount of fluid is seen, evidenced by the opacity above the diaphragm, with a horizontal upper margin. The lung has retracted towards the mediastinum.

Figure 203 (1 year later).— Since previous occasion fluid has collected from time to time. Radiogram shows an increase in fluid and some increase in lung volume, due to diaphragmatic adhesions beneath the fluid.

Figure 204 (2 years after admission, 9 weeks after refill).—There is little fluid and the lung has expanded considerably.

Tor-na-Dee Sanatorium. Dr J. M. Johnston.

Figure 205.— PULMONARY SPIROCHÆTOSIS CASTELLANI. (See Figure 187)

Clinical History.—A woman had, for seven years, complained of copious fœtid sputum ; her general condition was good. Physical signs suggested tuberculosis, with cavity formation of the right upper lobe. The sputum contained many spirochætes—confirmed by two bacteriologists—but no tubercle bacilli. Von Pirquet's reaction and complement fixation were both slightly positive ; the Wassermann was negative.

Screen.—The right side of the diaphragm was high and its movement restricted.

Radiogram.— There is considerable " roof tiling " of the right upper lobe, with infiltration of the lung near the apex, and an appearance suggestive of a thick-walled cavity. Dense nodules at each hilum indicate healed tuberculosis.

Tor-na-Dee Sanatorium. Dr J. M. Johnston.

FIGURE 202

FIGURE 203

FIGURE 204

FIGURE 205

Figures 206–211.—ARTIFICIAL PNEUMOTHORAX. (See Figure 186)

Clinical History.—Lassitude, cough, expectoration—with some blood—loss of weight and sweating began two months ago. Physical signs of active disease were present in the right upper lobe, especially behind, along the septum. No cavities were detected.

Screen.—Diaphragmatic movement was free; the apices were clear.

Radiograms.—Figure 206 (On admission).—A thick, triangular band, with its apex at the hilum, stretches to the lateral chest wall. The appearance suggests interlobar pleural thickening, with tuberculous deposits up to the clavicle and involving also the left hilum. The patient did not improve rapidly, so pneumothorax was decided upon.

Figure 207.—Two refills of gas (600 cc.). The upper lobe has retracted from the chest wall. The thickened band is seen at the base of this lobe and a large cavity in its midst. The lower lobe is unaffected.

Figure 208.—Fourth refill (1450 cc.). Further collapse in the lobe has occurred; the lower one is unaltered.

Figure 209.—Eighth refill. The lower lobe has separated somewhat from the chest wall.

Figure 210.—Later stages. The upper lobe is well collapsed, the lower one unaltered.

Figure 211.—Final stage. Upper lobe is completely shrunk, whilst the lower one is slightly collapsed, though physical examination demonstrated the presence of gas surrounding it, save at the diaphragm.

Result.—The patient did very well, leaving hospital in good general health, without cough, expectoration or fever.

Tor-na-Dee Sanatorium. Dr J. M. Johnston.

FIGURE 206

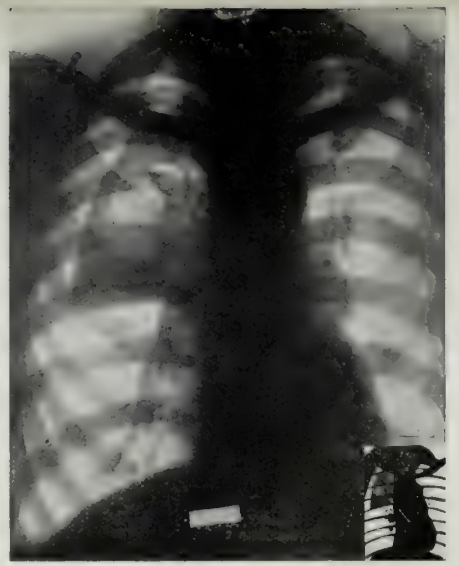


FIGURE 207

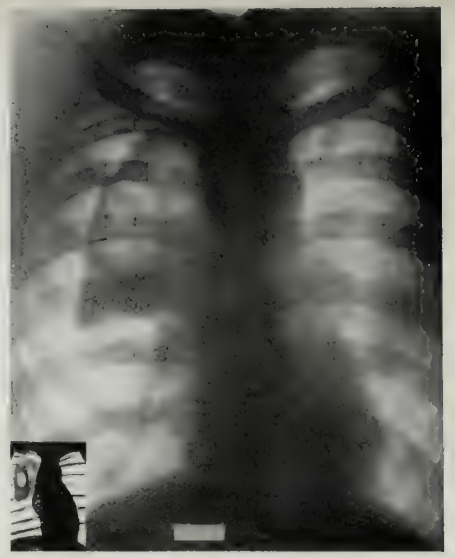


FIGURE 208

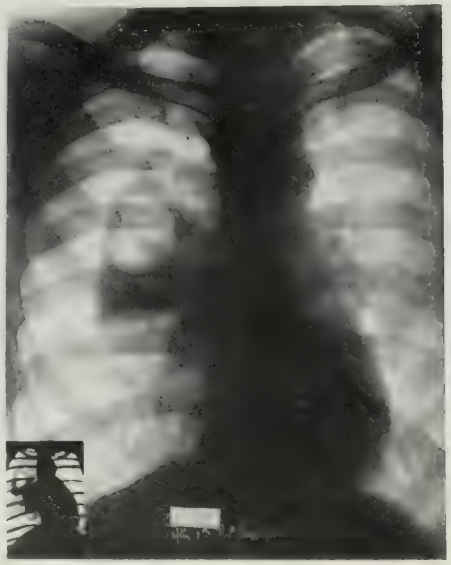


FIGURE 209

FIGURE 210

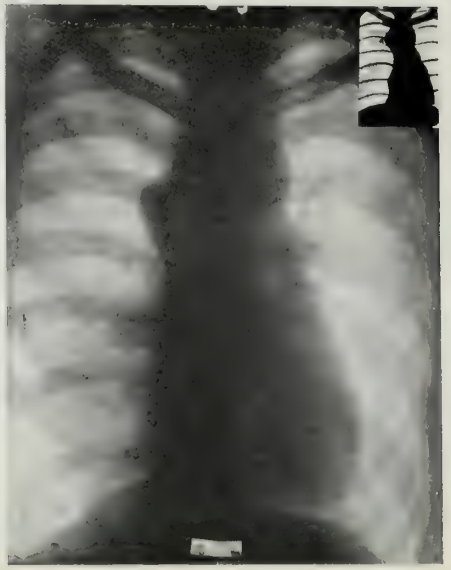


FIGURE 211

Figure 212.—THORACOPLASTY. (See Figure 186)

Operation.—Lengths of the ribs were excised near the costotransverse articulation. The falling in of the chest wall is due to approximation of the ribs to the midline and their downward tilting ("Bucket Handle" action).

Radiogram.—The left side of the chest, together with the lung, has shrunk towards the mediastinum.

Vale of Clwyd Sanatorium. Mr H. Morriston Davies.

Figure 213.—THORACOPLASTY. (See Figure 186)

Similar case to Figure 212.

Vale of Clwyd Sanatorium. Mr H. Morriston Davies.

Figures 214 and 215.—THORACOPLASTY. (See Figure 186)

Clinical History.—Tubercle bacilli were found in sputum two years ago and on admission her general condition was very poor. There was active disease of the whole of the right lung, with cavity formation in the upper lobe.

Radiogram.—Figure 214 (On admission).—The whole right lung is affected; a cavity is seen behind the clavicle; the bronchi are dilated. Old disease is present in the left apex.

Operation.—Artificial pneumothorax was attempted, unsuccessfully, as, owing to adhesions, no pleural space was discovered. She went from bad to worse, so thoracoplasty was decided on and done by Sir Henry Gray.

Radiogram.—Figure 215 (8 months after operation).—Note the absence of ribs. Effectual collapse of the chest wall and lung has occurred.

Result.—The patient has been comparatively well, and tubercle bacilli have not been found since operation.

Tor-na-Dee Sanatorium. Dr J. M. Johnston.

FIGURE 212

FIGURE 213

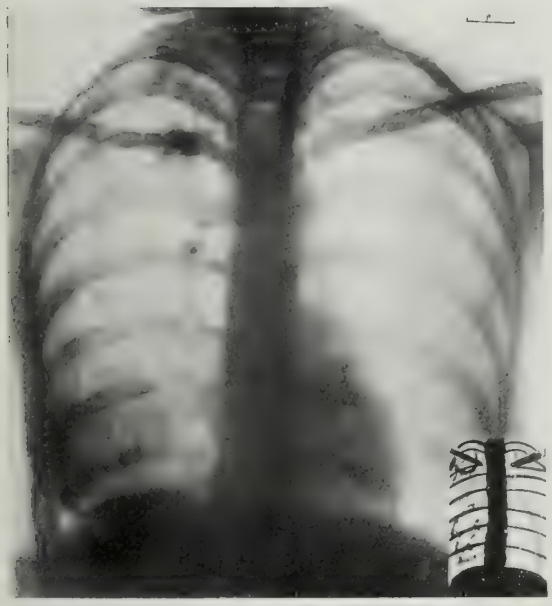


FIGURE 214

FIGURE 215

Figure 216.—DEXTRACARDIA. (See Figure 187)

A man aged 54.

Radiogram. The heart shadow appears on the reverse side. The high position and rounded outline of the left dome of the diaphragm indicates that the liver also is transposed.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 217. FOREIGN BODY BRONCHUS. (See Figure 184)

Clinical History.—During a sudden fit of coughing a boy, aged 4, inhaled the end of a small trumpet he was blowing. Twelve hours elapsed before admission, during which time he had several attacks of severe coughing, accompanied by stridor and restlessness. On arrival the child looked distressed and slightly cyanosed.

Radiogram. Opposite the fourth dorsal vertebra is an irregular shadow cast by the trumpet-end.

Operation.—Upper bronchoscopy revealed a foreign body in the main branch of the right bronchus; it was removed with forceps. Apart from some bronchitis, recovery was uneventful.

Dr A. E. Barclay. Sir Wm. Milligan.
Dr J. M. W. Morison.

Figure 218.—SARCOMA FOLLOWING PHTHISIS. (See Figure 187)

Clinical History. Four months ago a patient began to complain of slight cough, expectoration and pain in the right chest. He had lost weight and suffered from shortness of breath and fever. There were slight dullness and crepitations of the right apex. Marked dullness and absence of breath sounds were noted over the right base. Exploration with a needle procured some turbid fluid containing many polymorphs. Tubercle bacilli, with difficulty, were found in the sputum. Leucocytosis was present.

Screen.—The right side of the diaphragm was immobile.

Radiogram.—Some infiltration of the right apex is present, calcareous nodes are visible at the left root. There is marked opacity beside the sternum and above the diaphragm on the right side.

Remarks.—The diagnosis rested between mediastinitis and malignant disease, the latter being decided upon. Before death there was blood-staining of the sputum and stridor.

Tor-na-Dee Sanatorium. Dr J. M. Johnston.

Figure 219.—CARCINOMA LUNG. (See Figure 186)

Clinical History.—He began to lose weight fifteen months ago and now showed severe toxæmia. There was great flattening and absolute dullness of the left chest, with cardiac displacement: no tubercle bacilli were found.

Radiogram.—The left lung, save the apex, is uniformly opaque; the mediastinum and trachea are drawn to the left.

Result.—Autopsy, three months later, showed the whole of the left lung to be adherent. It was honeycombed with purulent cavities resembling tubercle, but, microscopically, they were endothelioma; some tubercles were present.

Tor-na-Dee Sanatorium. Dr J. M. Johnston.

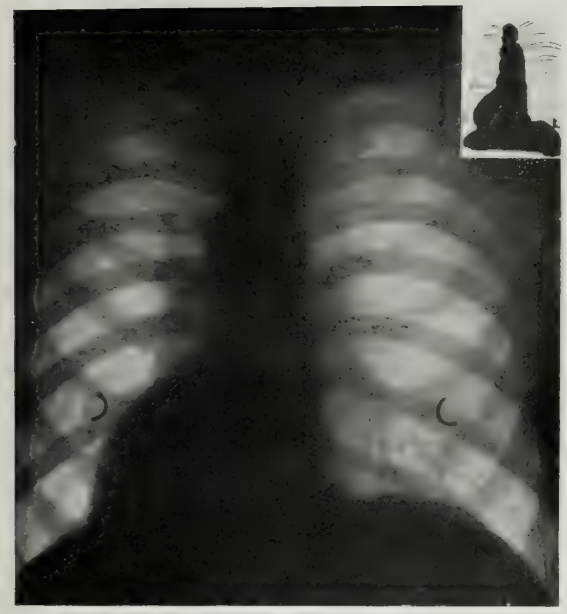


FIGURE 216

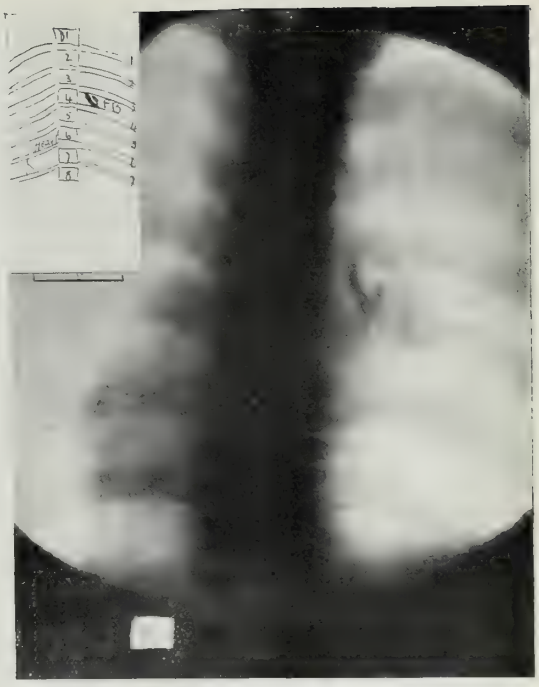


FIGURE 217

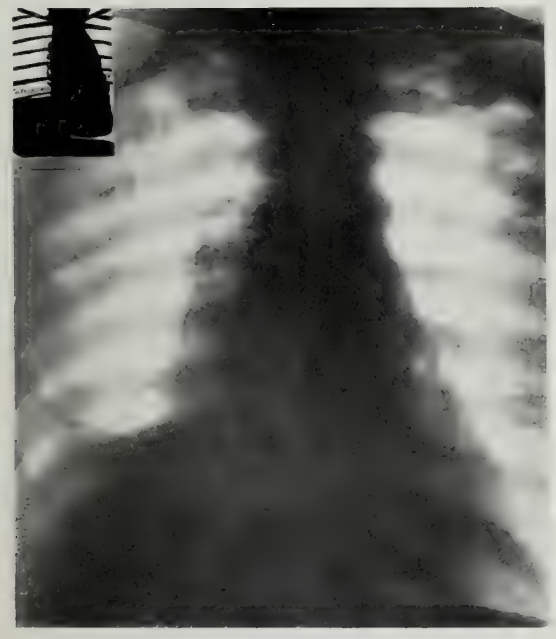


FIGURE 218

FIGURE 219

Figure 220. MEDIASTINAL LYMPHADENOMA. (See Figure 186)

Clinical History.—A man aged 25 had a history of a cough, with little expectoration, which had lasted three years. Recently he had had indigestion and diarrhœa accompanied by night sweats and pyrexia. The left chest was dull and percussion showed deficient air entry ; a pleural rub was heard.

Screen.—Marked opacity about the upper part of the mediastinum. The left section of the diaphragm moved opposite to the right, inferring paralysis due to interference with the phrenic nerve.

Radiogram.—An irregular shadow caused by a tumour is seen at the hilum of the left lung. On the right side is a general increase in the mediastinal shadow.

Subsequent History.—With rest and deep therapy the pyrexia and cough disappeared and the shadow decreased in size. Two months later symptoms returned and progressed until death, ten months later.

Autopsy.—The anterior mediastinum and hilum of the left lung were involved in a growth which had ulcerated into the upper bronchus. The posterior mediastinum was a mass of secondaries, which were found also in the pleura and heart, where one the size of a walnut was found. Microscopically it was a lymphadenoma showing fibrosis and degeneration. It may have been thymic in origin.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 221.—LYMPHADENOMA. (See Figure 186)

Clinical History. Symptoms began fifteen months ago when the condition was thought to be tuberculous. She had a cough with scanty sputum, which was occasionally blood-stained. There was pain in the left chest and slight pyrexia. Dullness was present over nearly all the left lung with faint breath sounds and a few rales at the apex. The left cervical and axillary glands were enlarged, one was excised and proved to be lymphadenoma. Sputum showed absence of tubercle bacilli, Von Pirquet reaction and complement fixation were positive.

Screen.—A non-pulsatile swelling was seen, occupying and extending beyond the mediastinum. The diaphragm was high and moved badly.

Radiogram.—A large swelling extending widely into the left side and to a less degree on the right occupies the mediastinum.

Result.—Death occurred one year later, no autopsy.

Tor-na-Dee Sanatorium. Dr M. J. Johnston.

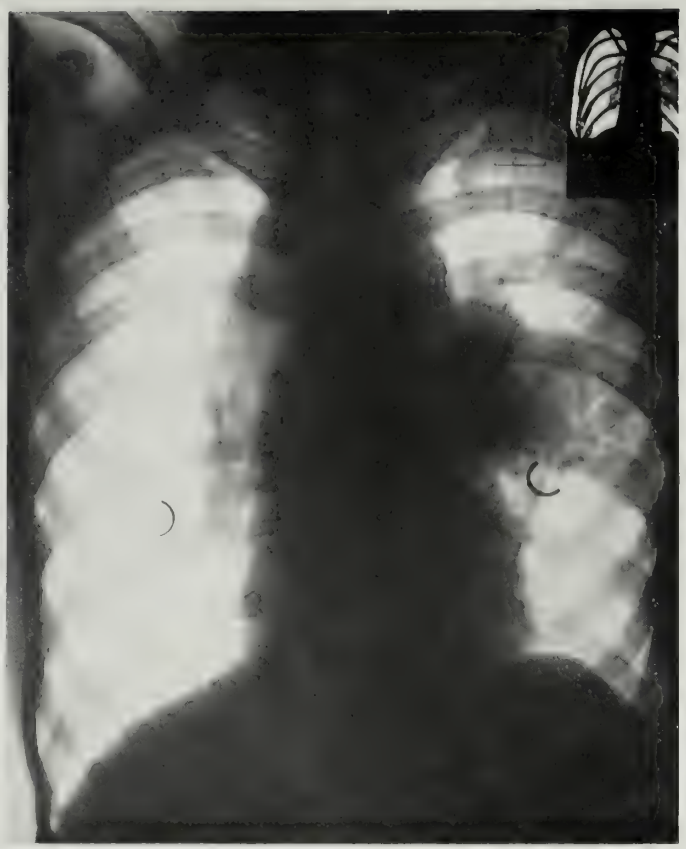


FIGURE 220

FIGURE 221

Figure 222. CARCINOMA LUNG. (See Figure 186)

Clinical History.—A man, aged 66, had pneumonia of the right lung eleven months ago, from which he apparently recovered, though the upper part of the lung remained opaque to X-rays. Three months ago he suddenly felt ill and vomited. Since then he has been weak and breathless.

Radiogram.—The upper part of the right chest is contracted and the lung solid, being occupied by new growth. The diaphragm is raised and its outline irregular, indicating the presence of adhesions.

Autopsy.—The stomach was found to be malignant.

Mr O. A. Marner. Dr E. I. Spriggs.

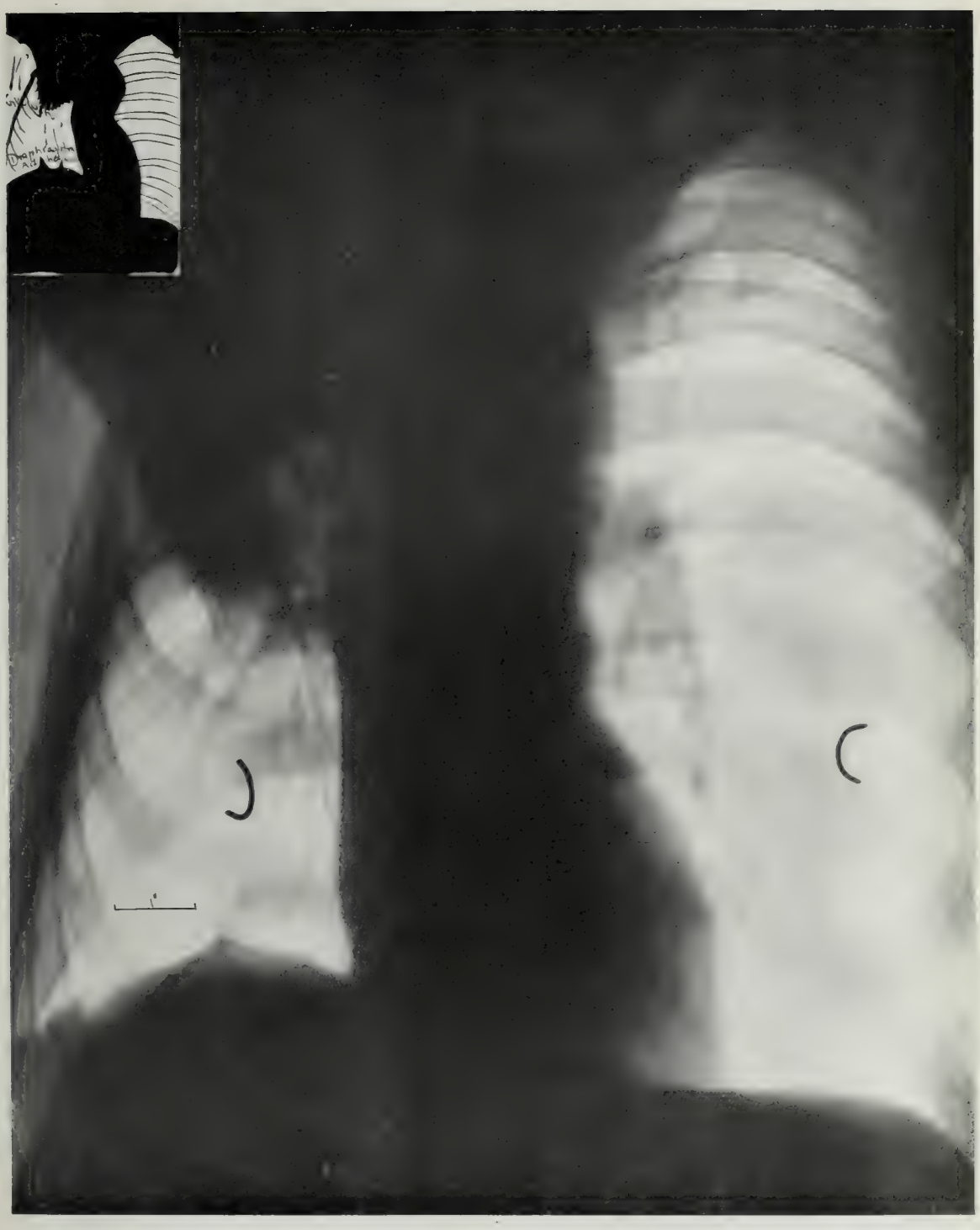


FIGURE 222

Figures 223 and 224. CARCINOMA LUNG. (See Figure 186)

Clinical History.— A man of 42 gave a history of pallor, dry cough, dyspepsia, and pain between the spine and right scapula. Slight pyrexia was present, pulse 105. There was dullness, bronchial breathing, bronchony and whispering pectoriloquy over the upper two lobes of the right lung: no rales. The left vocal cord was sluggish and limited in its movements.

Screen.—The right side of the diaphragm was paralysed.

Radiograms.— Figure 223 (Lordotic position, P.A.).—The upper two-thirds of the right chest is uniformly opaque: the lower margin of the shadow is sharply cut off. The opacity has involved the left hilum.

Figure 224 (A.P.). —The upper lobe of the right lung casts a dense shadow.

Remarks.—The sharp, lower edge of the opacity is regarded as the lower border of the upper lobe in horizontal profile. Exploration with a needle was negative. The epiarterial bronchus is involved.

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 225.—SARCOMA LUNG. (See Figure 186)

Clinical History.—Admitted as a supposed phthisis the diagnosis of tumour was made as the result of X-ray examination.

Radiogram.—The whole upper lobe on the left side is absolutely opaque.

Operation.—The growth was removed; it proved to be a sarcoma.

Result.—When last heard of, a year later, the patient was well and at work.

Dr E. W. H. Shenton.

Figure 226.—DERMOID CYST OF CHEST. (See Figure 186)

Clinical History.—A small length of the third rib had been resected thinking the condition was one of empyema. She had a small tube in the cavity and carried about a fine catheter, by which she drew off excessive secretion.

Screen.—Against expectation the diaphragm moved well; a shadow resembling that of the heart was apparent on the right side.

Radiogram.—The coiled-up catheter is seen in a rounded, dense area. Two teeth can be identified.

Operation.—Two inches of the fifth rib were removed, bringing into evidence a hard mass under the fourth rib; this was removed and proved to contain teeth. The openings were united.

Result.—Though still discharging, the patient left the nursing home fairly well.

Dr A. C. Fowler.

FIGURE 223

FIGURE 224

FIGURE 225

FIGURE 226

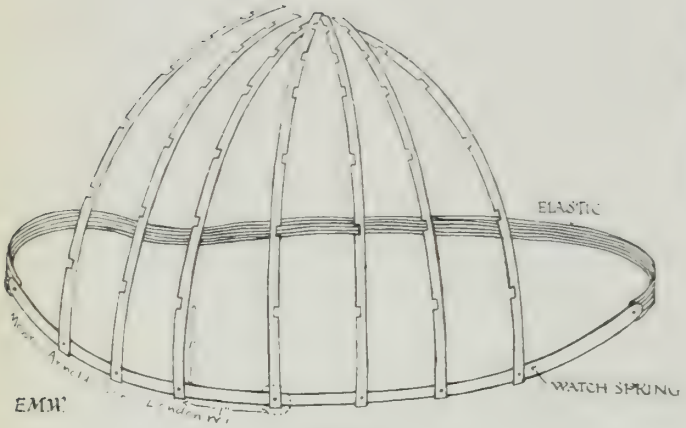
Figure 227.—HYDATID OF LUNG. (See Figure 187)

There is a well-marked, rounded opacity at the base of the right lung, due to the presence of a cyst.

Dr L. S. Debenham. Mr R. P. Rowlands.

FIGURE 227

NERVOUS SYSTEM



SCALE

FIGURE 228

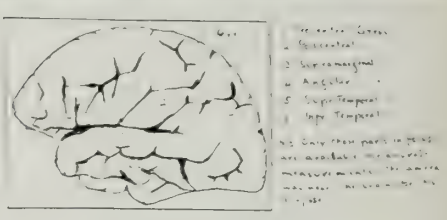
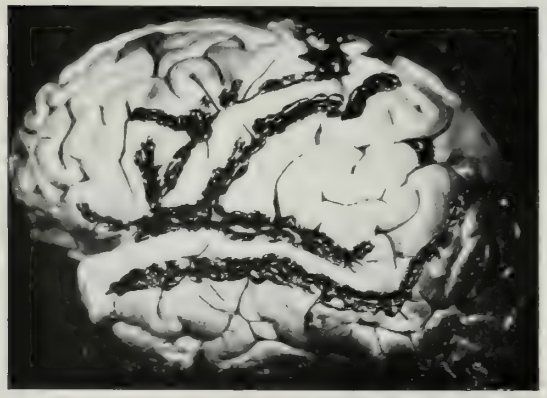


FIGURE 229



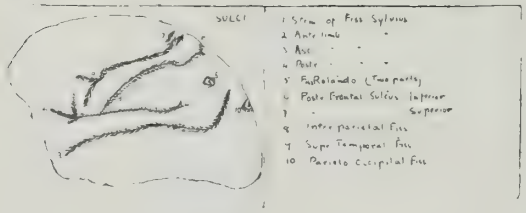
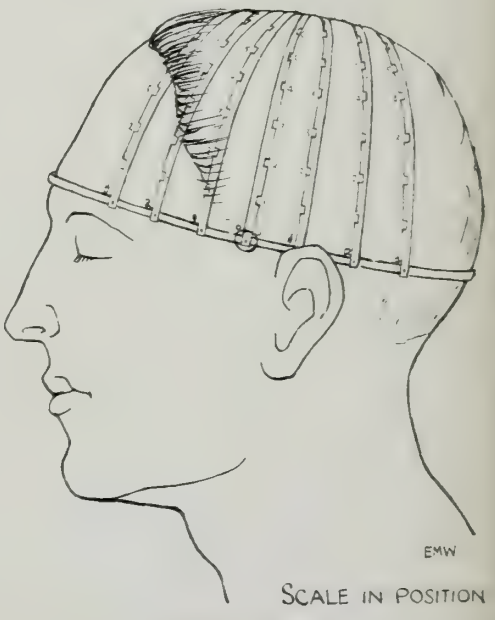


FIGURE 230



SCALE IN POSITION

FIGURE 231

Figures 228–231.—PREPARATION OF THE KEY RADIOGRAM. (See page 15)

A scale was prepared consisting of a strip of watch-spring, 7 in. (17·5 cm.) long, whose ends were connected together by a piece of elastic (Fig. 228). At intervals of an inch seven strips of spring 4 in. (10 cm.) long were fastened at right angles to it, the central one being marked 00 inches. Holes, an inch apart, were made in the verticals, through which were threaded silver wires. (For clarity in illustrating, the inches were indicated by notches instead of wire in Figs. 228 and 231.)

The head of a dissecting-room subject (age 39) having been radiographed, to make certain that there was no great brain shrinkage—which there was not—the cerebrum was removed in the usual way and its membranes stripped off. A photograph was taken to indicate the type of brain being dealt with (Fig. 229): fortunately it proved to be particularly well hardened: the cerebral hemispheres weighed 41 oz. ($1\frac{1}{4}$ kilo.). A mixture of red lead and warm vaseline was now painted on the more important sulci and a second photograph obtained (Fig. 230). [The width of the paint is more apparent than real, the majority having sunk well into the sulci—see Fig. 232.] The brain, covered with tissue paper—to prevent dissemination of the opaque material—was replaced and the scale fitted on the *unshaven* head (Fig. 231). It passed from the glabella to the external occipital protuberance, lying just above the junction of the pinna and scalp. The circumference of the head in this line, which is known as the base-line, was $22\frac{1}{2}$ in. (56·2 cm.). The scale having been adjusted until its central point 00 lay midway between the glabella and external occipital protuberance, the upright wires were placed at right angles to it and fixed by means of thread wound round the head. The breadth across the head along each vertical, from base-line to base-line, was measured. (Only the central five gave a precise reading.)

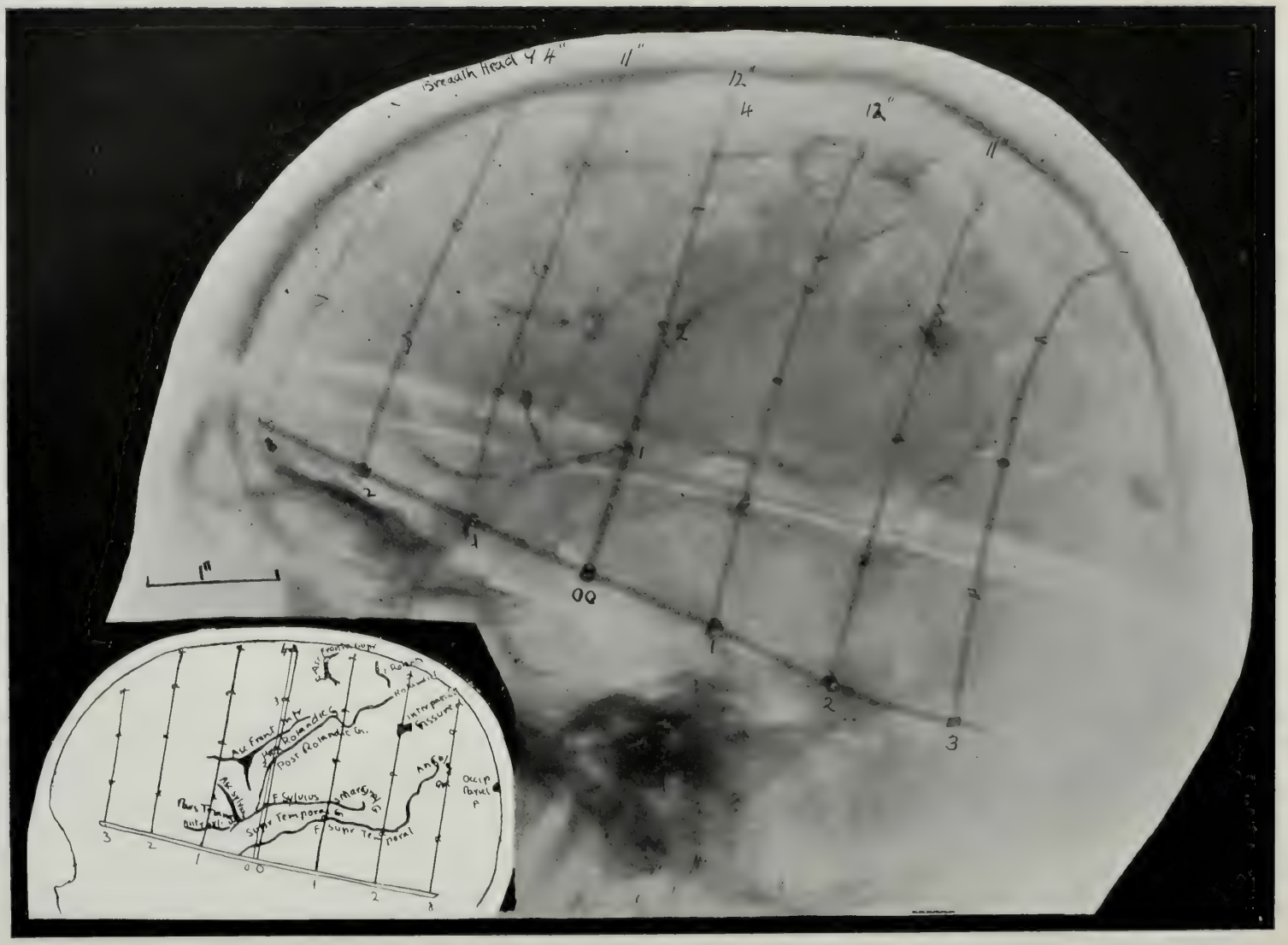

Breadth Head 4 4"
11"
12"
4
12"
11"
1"
00
1
2
3
Asc Frontal Conv
Ascending Frontal
Post Rolandic G.
Intraparietal Fissure
Angular G.
Occip Parietal
F Sylvius
Marginal G.
Sup Temporal
F Sup Temporal

FIGURE 232

Figure 232.—KEY RADIOGRAM

A pure lateral radiograph was now taken; that this position was obtained is shown by the base-line being straight—any deviation causing a curve to appear convex upwards or downwards, as the case may be. The following precautions were taken:—

1. The tube was 2½ ft. (·75 m.) from the head.
2. The rays were centred on the point 00.

The curvature of the head renders only the central area available for accurate localisation; it represents an area of about 16 sq. in. (100 sq. cm.). This limitation precludes study on the occipital region. The key is of the greatest value for the supramarginal, angular, superior temporal, and pre- and post-Rolandic convolutions, all of which have been insufficiently charted in man. It will be noted that vertical fissures—*e.g.* Rolandic sulcus—are shortened, and horizontal ones—*e.g.* Sylvian—appear nearer the vertex than one sees depicted in text-books; these appearances are due to the curvature of the head. Subsequent removal of the brain showed it to have been in excellent position, the temporal poles being well buried under the wings of the sphenoid.

(The thinness of the negative in Figure 232 was due to the fact that all attention was focused on making manifest the red lead.)

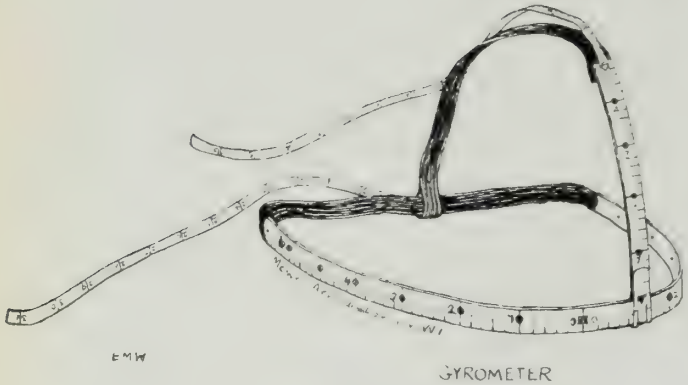


FIGURE 233

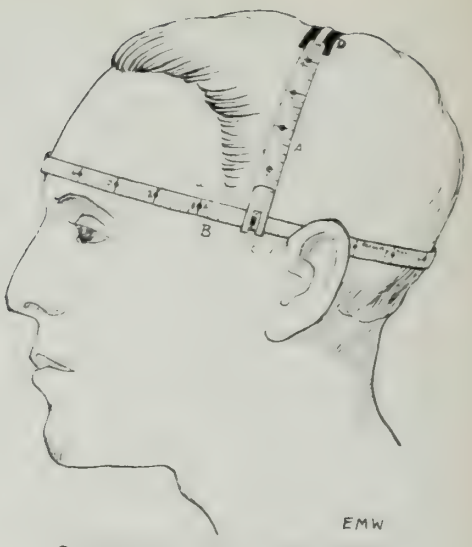


FIGURE 234

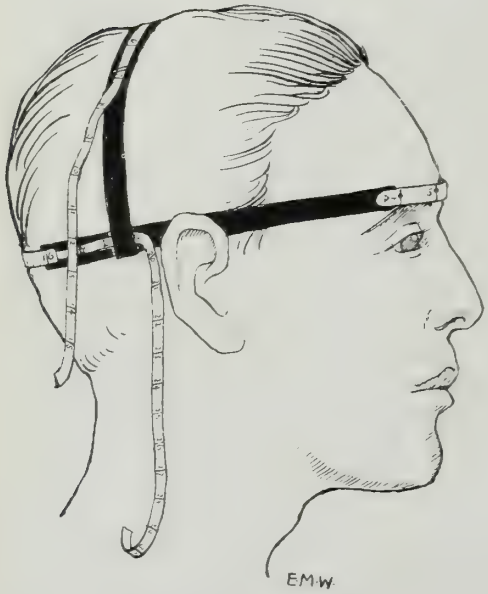


FIGURE 235

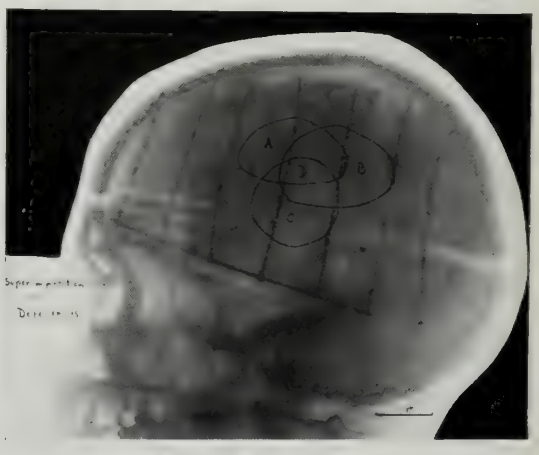


FIGURE 236

Figures 233–235.—THE GYROMETER

To localise the brain underlying a cranial gap, the following measurements are necessary :—

1. The point at which a vertical dropped from the centre of the gap cuts the base-line.
2. The vertical height of this line.
3. Dimensions of gap.
4. Circumference of the head on a line drawn through the glabella and external occipital protuberance. This will be referred to as the G.O. or base-line.
5. Breadth of head in the line of this vertical.

For routine work, 1, 2 and 3 are all that are required, the distances being transferred directly to a dolichocephalic or bradycephalic key, whichever type of skull the patient possesses. Mr Mason has kindly had manufactured a simple inexpensive instrument for measuring these distances and for preserving a radiographic record. It may be called a gyrometer, in that it indirectly measures gyri (Fig. 233). The instrument is composed of a thin strip of celluloid half-an-inch wide with inch graduations and 0·2 subdivisions (0·5 cm.). The central point was marked zero, 00, inches (2·5 cm.) extending on each side of it. The ends of the strip are united by a piece of elastic which serves to keep the celluloid in close apposition to the head. The celluloid and elastic form the base-line on the patient's head. The celluloid strip is provided with a curser of similar material marked from 0 to 4 in. (10 cm.), which slides along at right angles. A piece of elastic connects the free end of the curser with the elastic part of the base-line in such a way that it can move with the former. The elastics are provided with tapes whose inches continue those of the celluloid strips ; by this means the circumference of the head in the G.O. line, and its breadth at any point, can be easily read off. For radiographic purposes the strips are studded with lead rivets at intervals of an inch, the central one being square to distinguish it from the others.

After combing the hair suitably and possibly wetting it, the gyrometer is applied to the patient's head in such a way that the main strip passes from the glabella above the root of the pinna to the external occipital protuberances with its centre midway between these points (Figs. 234 and 235). This strip and its elastic thus form the base-line. The curser is adjusted to pass over the centre of the defect. The distance of the curser from the central point 00 is read off, and the height of the centre of the depression above the base-line. The circumference of the head and the breadth along the line of the curser are recorded on the tapes, and the diameter of the gap is measured. To preserve a record, a radiograph is now taken (Fig. 237), with the following precautions to prevent distortion :—

1. The tube is at least $2\frac{1}{2}$ ft. (·75 m.), from the patient's head.
2. The rays are centred on the central rivet.
3. A purely lateral radiograph is taken as shown by the line of dots being straight.

If such measures are not taken, the strangest of effects are produced.

Since heads vary greatly, in length and breadth, these must be allowed for. Length is much the more important and must be corrected for before the breadth. There is only one horizontal constant for length and that is :

$$1.\ \frac{\text{Circumference of head in G.O. line of key.}}{\text{Circumference of head in G.O. line of patient.}}$$

When the distance of the curser from the centre has been multiplied by this constant the corrected length (a) is marked on the key. The breadth of the skull varies at different points along the G.O. line and is found by measuring the distance between the elastic and celluloid parts of the base-line along the line of the curser. The breadth constant is :

$$2.\ \frac{\text{Breadth of skull at point } (a) \text{ on key.}}{\text{Breadth of skull at point } (a) \text{ on patient.}}$$

After determining this constant the height of the centre of the gap above the point (a) is recorded on the key and the area of the defect plotted out. (Mr Mason has had prepared a number of prints of the key radiograph so that the corrected measurements can be transferred direct to it without the need of radiographing the patient's skull.)

Figure 236.—SUPERIMPOSITION, DEFECTS. (See page 17)

Figures 237 and 238. JACKSONIAN EPILEPSY. (See Figure 232)

History of Case.—Mrs S., aged 39, while riding a bicycle fifteen years ago, was thrown over the handle-bars and fell on her head, she was stunned; but soon recovered consciousness. Four years later she began to have symptoms of headache, dizziness, etc.

After another year—five years after the accident—slight twitching of the left angle of mouth and left side of tongue occurred occasionally and continued more or less at irregular intervals for another two years. She had consulted a "Specialist" who suspected a tubercular tumour of brain.

During the next two years the twitchings of the face and tongue became more severe and more frequent and tended to be accompanied by clonic contractions of the left arm, but no loss of consciousness, until eventually the fits became continuous, and she passed into a condition of *status epilepticus* with complete unconsciousness.

Operation.—Trephining was done over the facial centre and surrounding area on right side of skull. The dura was opened but nothing definitely abnormal discovered. The wound healed normally and convulsions entirely ceased, but slight weakness of left side of face and left arm persisted for two or three months, and gradually disappeared.

She remained free from fits of any kind for four years, during which time she married and gave birth to a child. Seven months after the birth of the baby slight twitching of face and tongue recommenced, but disappeared under medical treatment.

Two years later the fits recommenced and gradually increased in severity and frequency until finally they recurred every ten minutes—spasm followed by clonic contractions of angle of mouth, tongue, and platysma on the left side. There was no loss of consciousness but the attacks were always preceded by a sensory aura.

Spinal puncture was done, and about 10 cc. of clear cerebrospinal fluid was removed. No improvement resulted.

Second operation performed. A flap was raised. Dura found to be firmly adherent to surface of brain to the edge of bone. A little more bone was removed, enlarging the opening in all directions. The dura was incised and the adhesion to the brain divided until its surface was entirely free. The brain bulged slightly but pulsated. A perforated celluloid plate (as used by Mr Percy Sargent) was introduced between the brain and the edges of the opening in the bone, which overlapped it by about $\frac{1}{3}$ in. in every direction. The presence of the brain kept it firmly in place. The patient again made an excellent recovery. There were no fits of any kind for the first forty-eight hours: during the following ten days there were slight attacks at considerable intervals, and there was slight weakness of the left side of face and arm.

After ten days all symptoms ceased and she became apparently perfectly well.

At the present time, rather more than eighteen months after the operation, she has occasional slight twitching of the angle of the mouth and tongue.

Radiogram.—Note the defect and the gyrometer in position.

1. Circumference of head in G.O. line=21·25 in. (53·3 cm.).
2. Distance of curser from central point=·8 in. (2 c.m.).
3. Height of centre of depression=2·5 in. (6·25 cm.).
4. Breadth of head in line of vertical=11 in. (27·5 cm.).
5. Height 2 in. (5 cm.). Breadth, $2\frac{1}{2}$ in. (6·75 cm.).

The horizontal factor is $\frac{22{\cdot}5}{21{\cdot}25}=1{\cdot}06$, which means that for all practical purposes distances can be transferred direct from patient to key.

The breadth constant at a point ·8 in. (2 cm.) behind the central point is $\frac{12}{11}=1{\cdot}1$, which makes the height $2{\cdot}5\times1{\cdot}1=2{\cdot}57$ in. (6·7 cm.)—*i.e.* a difference of $\frac{1}{4}$ in. (·4 cm.).

It will be seen that the area affected is the lower part of the pre- and post-Rolandic gyri. From our present knowledge of this centre the lowest part of the area exposed was responsible for the symptoms. It will be necessary to superimpose several areas before it is possible to tell the precise area of cortex that presides over the face. (See Fig. 236.)

Dr H. H. Brown.

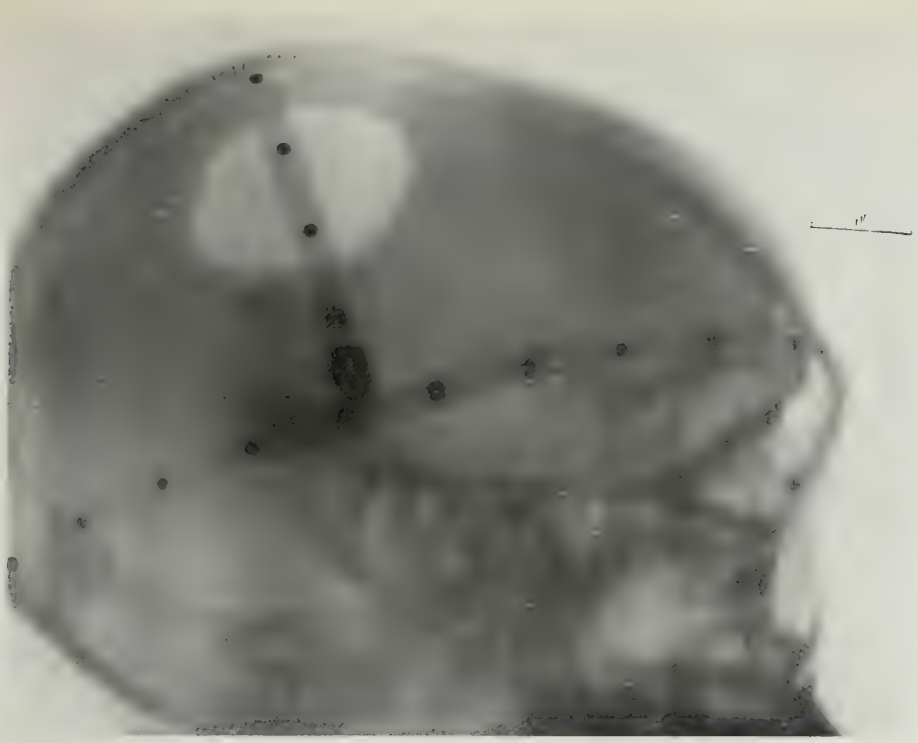


FIGURE 237

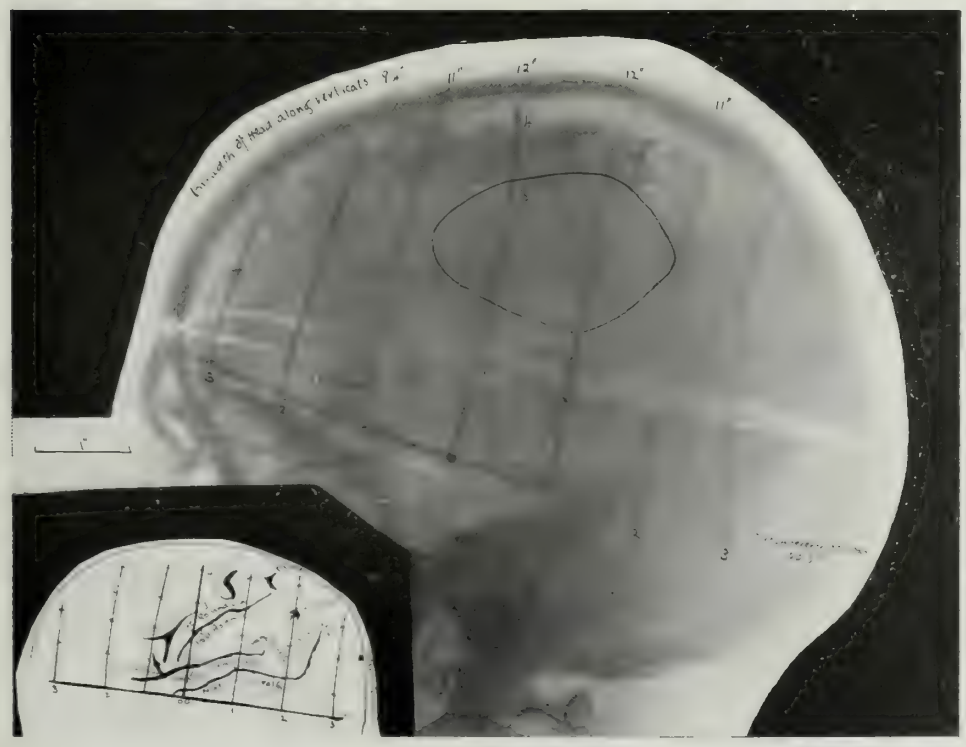


FIGURE 238

LIPOIDAL INJECTION

"Aucun danger, aucune douleur"[1]—Professor SICARD.

Figures 239–241.—NORMAL THECA

The radiograms were taken the day after 1 cc. of lipoidal had been injected into the subarachnoid space by way of the atlanto-occipital space.

Figure 239 (Supine).—The solution has passed downwards until arrested by the cul-de-sac of the dura opposite the second sacral vertebræ.

Figure 240 (Lying on side).

Figure 241 (Prone).—The solution has gravitated slightly upwards leaving traces at the exit of nerves.

L'Hôpital Necker. Prof. JEAN A. SICARD.

Figures 242 and 243.—SPINAL TUMOUR. (See Figures 239-241)

Radiograms (1 cc. lipoidal). The solution has become arrested in the dorsal region, its lower limit being the eighth disc. Its lower margin is very clearly defined, the upper one is not so sharp.

Operation.—M. Robineau found an extradural tumour at the level of the eighth dorsal vertebral disc. It was removed and proved to be a neuroglioma.

Result.—Complete recovery.

L'Hôpital Necker. Prof. JEAN A. SICARD.

Figures 244 and 245.—SPINAL TUMOUR. (See Figures 239-241)

History.—The patient had thyroid cancer.

Radiogram (1 cc. lipoidal).—Figure 244.—The solution has become arrested at the level of the fifth cervical disc.

Treatment.—A course of ten exposures to deep X-rays was instituted.

Radiogram (After treatment).—Figure 245.—The subarachnoid space has become partially patent, allowing some solution to pass downwards.

Result.—Considerable diminution in symptoms occurred.

L'Hôpital Necker. Prof. JEAN A. SICARD.

Figures 246–248.—SPINAL TUMOUR. (See Figures 239-241)

Radiogram (1 cc. lipoidal).—Unlike Figures 242-243 it is the upper limit which is sharply cut. The stoppage occurs opposite the first dorsal vertebræ.

Operation.—At operation M. Robineau found an extradural tumour in the predicted situation, which was removed. It was an angiofibroma.

Result.—A cure ensued.

L'Hôpital Necker. Prof. JEAN A. SICARD.

[1] It is essential, however, that the solution shall have retained its yellow colour and not turned black.

FIGURE 239

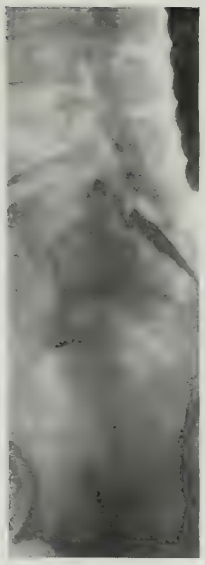


FIGURE 240

FIGURE 241

FIGURE 242

FIGURE 243

FIGURE 244

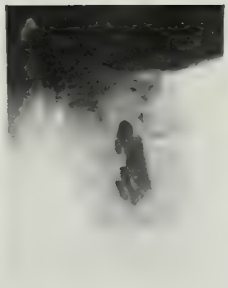


FIGURE 245

FIGURE 246

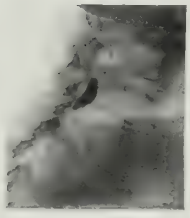


FIGURE 247

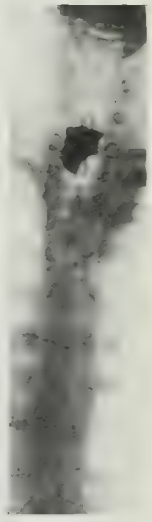


FIGURE 248

Figures 249 and 250. MENINGITIS. (See Figures 239-241)

Radiograms (A.P. and Lat.).—1 cc. lipoidal. The solution is spread out in patches over the region of inflammation.

L'Hôpital Necker. Prof. Jean A. Sicard.

Figure 251.—LIPOIDAL ASCENDING

The case was one of cerebral tumour.

Radiogram.—The solution has passed up into the ventricular system, indicating the patency of the foramina of Majendie and Luschka.

L'Hôpital Necker. Prof. Jean A. Sicard.

Figures 252 and 253.—TUBERCULOUS ABSCESS. (See Figure 240)

Pott's disease was present in the first lumbar disc.

Radiogram (Trendelenburg position).—Shows clearly the limits of the cavity. Streaks of lipoidal indicate the origin of the pus.

L'Hôpital Necker. Prof. Jean A. Sicard.

Figure 254.—SCIATICA

4 cc. lipoidal has been injected epidurally by the sacrococcygeal route.

Radiogram.—The solution has spread out through the lumbar and sacral foramina along the nerves of the sciatic plexus.

Result.—Cure.

L'Hôpital Necker. Prof. Jean A. Sicard.

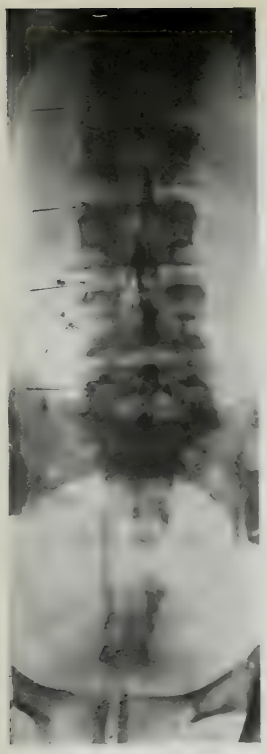


FIGURE 249

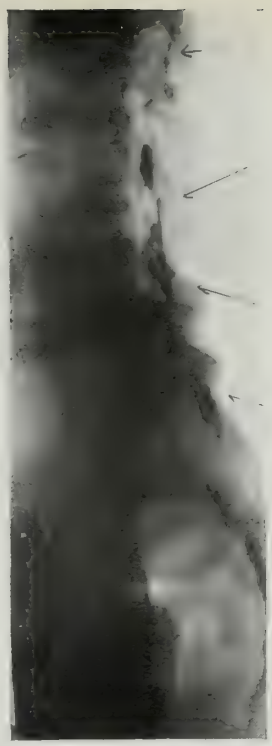


FIGURE 250

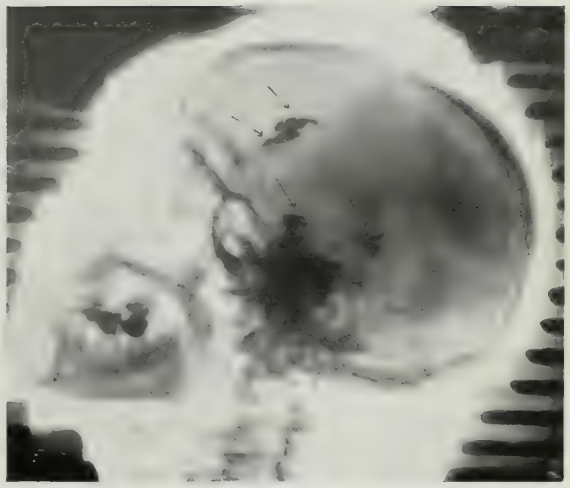


FIGURE 251

FIGURE 252

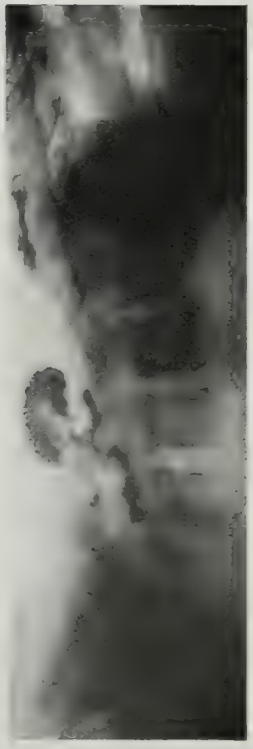


FIGURE 253

FIGURE 254

Figures 255–257.—VENTRICULOGRAMS

Figure 255 (Lateral position of head).—Ventriculogram showing outline of dilated lateral ventricle filled with air.

Figure 256 (Inverted position of head).—Ventriculogram showing outlines of dilated left lateral and third ventricles. The air has failed to enter the aqueduct of Sylvius, indicating an obstruction at this site—ventricular hydrocephalus of the third degree.

Figure 257 (Inverted position of head).—Ventriculogram showing outlines of dilated left lateral third and fourth ventricles. Note the air in the right foramen of Monro, and the bulging roof of the fourth ventricle. Obstruction at the roof of the fourth ventricle is indicated. Ventriculogram in conjunction with the coloured indicator test.

Prof. J. Fraser, "Hydrocephalus," *Brit. Jour. Surg.*, vol. x., No. 28.

FIGURE 255

FIGURE 256

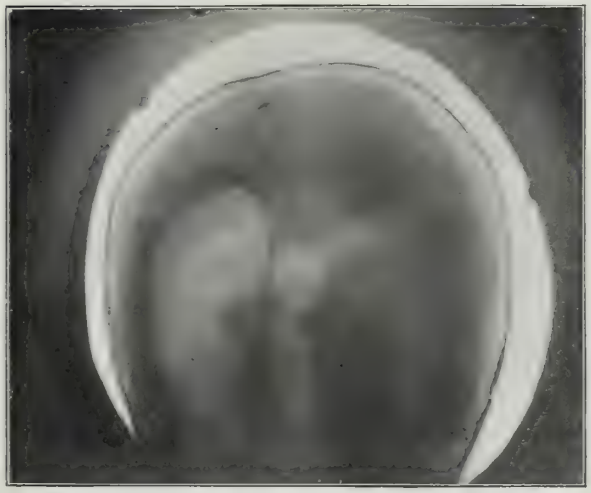


FIGURE 257

Figures 258 and 259.—LUMBAR SPINA BIFIDA

Clinical History.—"A twin aged 5 weeks was admitted to the General Infirmary at Leeds with a large thin-walled meningocele in the lumbar region. Both legs were paralysed, the one quite flaccid, the other showing some resistance to movement. There was a suspicion of condylomata in the anal region, and the facies further suggested a syphilitic taint, but the family history was good, and the other twin to all appearance healthy.

"At operation, all the lumbar laminæ were wanting and the cord was lying on the posterior surfaces of the vertebral bodies. The sac was excised. In the belief that spina bifida is a symptom and not simply a congenital defect, I threaded silkworm sutures from the subdural space into the erector spinæ muscles, hoping that thereby the cerebrospinal fluid would drain off into the muscular spaces. The wound was then closed, but remained unhealed for about two weeks, during which time it discharged cerebrospinal fluid copiously. Rapid healing now began, and after three days hydrocephalus developed. As the condition was causing great pain it was decided to drain the lateral ventricle. A curved incision was made over the parietal bone about one inch above the external auditory meatus. A portion of the bone was removed with scissors, and a crucial incision into the dura was made. The brain, thus exposed, was unduly moist. A bundle of short silkworm sutures were thrust into the ventricle, and a large amount of cerebrospinal fluid welled up. The bundle was secured to the cerebral surface of the dura mater, and the skin drawn together with silkworm sutures. The cranial bones at first moved curiously on each other, but twelve hours later the skull had consolidated.

"This apparently gave relief from the pain, and there was no return of the hydrocephalus during the three weeks following, and the spina bifida wound remained closed. One week after discharge the child died. No particulars were obtainable.

"The rapid development of hydrocephalus following the healing of the spina bifida wound is a strong argument in favour of the theory –advanced by John Frazer and others –that spina bifida should not be regarded as a purely local defect, but as the sign, in the cord, of increased pressure of the cerebrospinal fluid. The cause of this increased pressure is probably some interference with its outflow, possibly by adhesions."

Silhouette Radiogram.—Note the large clear sac in Figure 258, and its shadow in Figure 259, which is a postero-anterior view. (*Brit. Med. Jour.*, 10th November 1923.—A. P. B.)

Figure 260.—CERVICAL SPINA BIFIDA

A baby of 3 months.

Silhouette Radiogram.—A small sac is apparent in the nape of the neck; it was successfully removed. No communication with the dura mater was found.

Result. - Recovery.

Mr A. Richardson.

Figure 261.—ENCEPHALOCELE

A baby aged 6 weeks was admitted for a swelling of the head.

Silhouette Radiogram.—A swelling, with central opacity, projects from the occipital region. The density indicates the presence of brain.

Mr W. Thompson.

Figures 258-261 from *A Descriptive Atlas of Radiographs of the Bones and Joints*, by A. P. Bertwistle (John Wright & Sons, Bristol).

FIGURE 258

FIGURE 259

FIGURE 260

FIGURE 261

VASCULAR SYSTEM

Figure 262.—ANEURISM—HEART. (See Figure 186)

Clinical History. A man of 45 complained of sudden pain in the chest after a hurriedly eaten meal. The pain disappeared, only to return two months later, when it was chiefly epigastric and lumbar. No abnormal physical signs were made out. Wassermann reaction strongly positive.

Screen.—The lateral view showed a well-defined but less deeply hemispherical shadow than A.P. It projected from the posterior part of the heart shadow and did not approach the posterior thoracic wall. Anteroposteriorly the shadow moved to the left with each heart beat and definitely pulsated with each ventricular systole. It moved freely, with respiration in close conjunction with heart and diaphragm shadows.

Radiogram.—A well-defined hemispherical opacity is seen projecting from the left border of the heart shadow, the left edge of which is clearly visible against the less opaque lungs.

History Subsequent.—Under potassium iodide, gr. xxv, t.d.s., the pain disappeared and the patient was able to leave hospital.

Dr W. L. Lindsay Locke. Dr N. Mutch.
Dr A. P. Beddard.

Figure 263.—ANEURISM—AORTA. (See Figure 186)

Clinical History.—A man aged 47 complained of pain under the sternum. There was a history of syphilis.

Radiogram.—An aneurism is present in the aortic arch.

Dr T. I. Candy.

FIGURE 262

FIGURE 263

Figure 264. ANEURISM OF DESCENDING AORTA. (See Figure 187)

Radiogram.—To the left of the sternum, and less dense than the heart, is seen a well-defined shadow. There is also some increase in mediastinal opacity to the right of the sternum.

Dr E. W. H. Shenton.

Figure 265.—ANEURISM—AORTA. (See Figure 187)

Clinical History.—A man of 54 had experienced pain in the chest and dyspnœa on exertion for six months. There was impaired resonance on each side of the manubrium sterni. The Wassermann reaction was positive.

Screen.—The posterior mediastinum was obscured by the pulsating shadow of an aneurism to within a short distance of the diaphragm.

Radiogram.—A large shadow is seen to right and left of the manubrium apparently caused by aneurismal dilatation of the transverse and descending aorta. The heart shadow is enlarged and its long axis is less horizontal than normal.

Dr N. Mutch.

Figure 266.—ANEURISM OF TRANSVERSE AORTA. (See Figure 187)

Radiogram.—The upper mediastinal shadow is greatly enlarged to the right and left of the sternum.

Remarks.—The diagnosis of sarcoma was made, but at autopsy an aneurism was found.

Dr E. W. H. Shenton.

Figure 267.—ANEURISM. (See Figure 187)

Clinical History.—Five years ago a man aged 54 had dyspnœa on exertion, and a year later had an area dull to percussion over the first to third costal cartilages on the right side. Screen examination showed slight broadening of the aortic shadow. The Wassermann reaction was strongly positive. At the time of examination dyspnœa was marked and the area of dullness was more conspicuous.

Screen.—An oblique view showed the aorta and branches to be dilated.

Radiogram.—The heart shadow is enlarged, projecting unduly to the left; that of the aorta is increased in the same direction.

Treatment.—A course of intravenous N.A.B. resulted at the outset in some reaction; once some bloodstained sputum was coughed up. Two months later all symptoms had disappeared.

Dr N. Mutch.

FIGURE 264

FIGURE 265

FIGURE 266

FIGURE 267

Figure 268.—CALCIFICATION OF ARTERIES

The anterior and posterior tibial and peroneal arteries and their larger branches are clearly identified. Note the ringed appearance and tortuosity.

N.B.—The tibia has suffered an oblique fracture.

Dr G. F. Stebbing. Sir Charters Symonds.

Figure 269.—CALCIFICATION OF ARTERIES

Silhouette Radiogram.—The posterior tibial, peroneal and plantar arteries are calcareous.

Dr L. A. Rowden.

Figure 270.—RUPTURE OF SCLEROSED ARTERY

Clinical History.—"A man aged 48 received a heavy blow on the back of the right leg from some falling timber. When I saw him there was extensive bruising of the whole calf. This was treated in the ordinary way and was later massaged. The massage rapidly reduced the discoloration and swelling, with the exception of an area near the middle of the leg and just behind the internal margin of the tibia. A swelling of the size and shape of an egg persisted in this area; it was much paler than the surrounding parts and was fluctuant. The swelling did not pulsate; it was diagnosed to be a deep hæmatoma. On the eighth day it was aspirated and bright red blood was removed. Firm pressure was then applied, but the swelling re-formed. Some days later it was again aspirated. A small notch could then be felt in the margin of the tibia. Pressure was again applied, but the swelling once more returned, on this occasion to a lesser degree. The leg was X-rayed on the sixteenth day, with the result shown.

"*Radiogram.*—There is an irregularity in the line of the posterior surface of the tibia, corresponding to the notch. The posterior tibial artery is in a fairly advanced condition of arteriosclerosis; at the level of the notch the artery has been driven against the bone and has broken. The fracture of the artery is shown faintly but distinctly. The swelling ultimately subsided and there was no apparent interference with the circulation in the foot."

Reprinted from *Brit. Med. Jour.*, 2nd May 1925. Dr D. L. Charters.

FIGURE 268

FIGURE 269

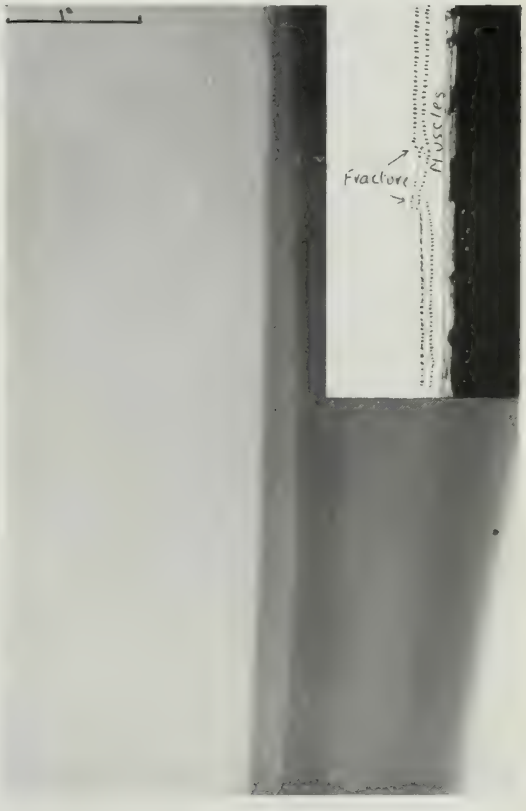


FIGURE 270

DENTAL SYSTEM

FIGURE 271

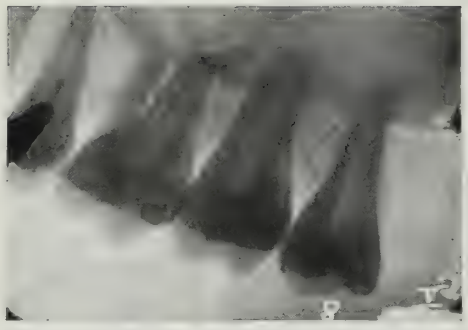


FIGURE 272

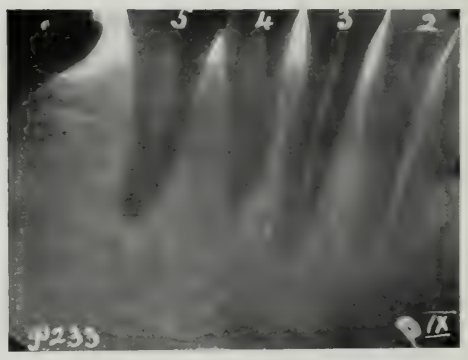


FIGURE 273

FIGURE 274

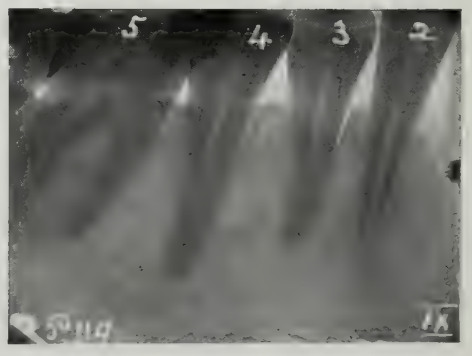


FIGURE 275

Figure 271.—NORMAL TEETH

Normal adolescent teeth; note that the wisdom teeth have not erupted.

Dr E. W. H. Shenton.

Figure 272.—NORMAL TEETH

A female of 24.

Three healthy molar teeth are seen; observe the absence of alveolar absorption or space between teeth and bone. The bone is uniform in structure. An inadequate filling occupies the root of the last premolar.

Dr A. C. Jordan.

Figure 273.—NORMAL TEETH

A male of 32.

Two bicuspid, a canine and two incisor teeth are seen. The root canals are well seen. The alveolus extends well towards the crown. Some condensation of bone is present round the peridental membrane.

Dr A. C. Jordan.

Figure 274.—NORMAL TEETH

The last bicuspid and two molar teeth are seen, both of the latter have been filled. Note the root canals.

Dr A. C. Jordan.

Figure 275.—NORMAL TEETH

A female of 24.

One molar, two premolar and a canine tooth are seen. Note the even grain of the bone and small depth of peridental membrane. The molar and second premolar teeth are stopped efficiently.

Dr A. C. Jordan.

Figure 276. PYORRHŒA ALVEOLARIS. (See Figure 274)

A male of 48.

There is marked absorption of the alveolar border leaving the teeth insufficiently supported. The peridental membrane is thickened. Note the tartar adhering to teeth separating them from the gum.

Dr A. C. Jordan.

Figure 277. PYORRHŒA ALVEOLARIS. (See Figure 274)

A female of 61.

The central incisors are lying almost unsupported by alveolus, their peridental membrane is thickened. There is marked absorption of the roots. The root of the left lateral incisor has been retained.

Dr A. C. Jordan.

Figure 278. PYORRHŒA ALVEOLARIS. (See Figure 274)

A female of 71.

The alveolus has almost disappeared, the bone has lost its structure.

Dr A. C. Jordan.

Figure 279.—PYORRHŒA ALVEOLARIS. (See Figure 274)

A male of 48.

The alveolus has receded almost to the tips of the roots which are surrounded by thick peridental membrane indicating infection.

Dr A. C. Jordan.

Figure 280. PYORRHŒA ALVEOLARIS. (See Figure 273)

Same case as Figure 276. The alveolus has been absorbed, exposing the neck and roots of several teeth.

A large amalgam filling occupies the front molar, its canals have been treated, and in one the bone has been penetrated. This predisposes to infection of bone.

Dr A. C. Jordan.

Figure 281.—ABSCESS ROOT. (See Figure 274)

Around the root tip of the lateral incisor is a rarefied area due to abscess formation, the result of obvious caries of the crown.

Dr A. C. Jordan.

Figure 282.—BRIDGE WORK. (See Figure 274)

A male of 43.

A bridge is seen embracing the first upper molar, the roots of which are affected.

Dr A. C. Jordan.

Figure 283.—BRIDGE WORK. (See Figure 274)

Same case as Figure 279. A bridge is seen grasping the molar and bicuspid teeth. The latter shows an incomplete filling in the root, the tip of which is surrounded by an abscess. The bridge is not fitting closely to the tooth, causing alveolar absorption.

Dr A. C. Jordan.

Figure 284.—BRIDGE WORK. (See Figure 273)

A male of 43.

The bridge has been secured to the molar and bicuspid teeth. The latter shows an inadequate filling of the root canal which has resulted in abscess formation at the tip.

Dr A. C. Jordan.

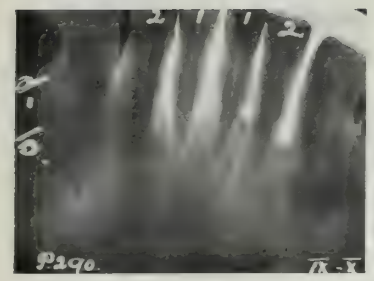


FIGURE 276

FIGURE 277

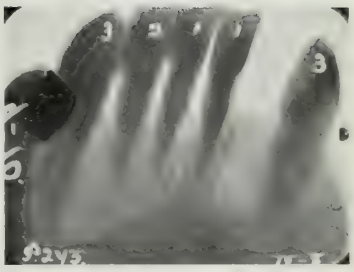


FIGURE 278

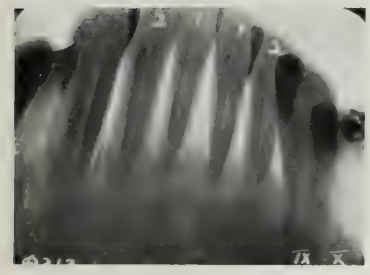


FIGURE 279

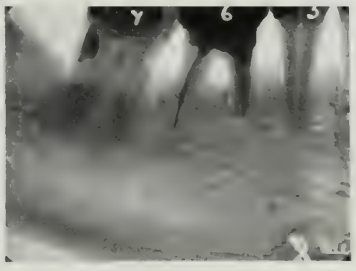


FIGURE 280

FIGURE 281

FIGURE 282

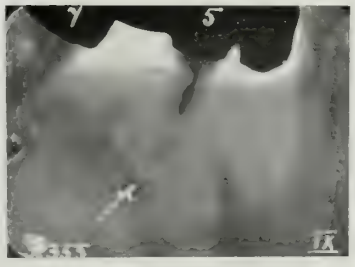


FIGURE 283

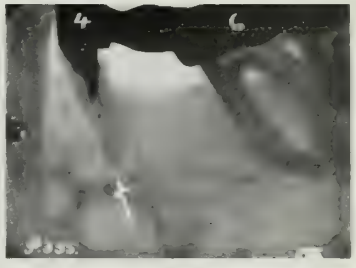


FIGURE 284

Figure 285.—ABSCESS ROOT. (See Figure 272)

A female of 55.

The front molar contains a large rough filling, some of which has entered the root canal at the tip of which an abscess has developed. There is absorption between its roots due to the roughness of the filling. The mental foramen is visible.

Dr A. C. Jordan.

Figure 286.—CROWN WORK. (See Figure 273)

The first bicuspid has been crowned. The root treatment is inadequate, resulting in an abscess. The molar tooth lies in contact with the antrum.

Dr A. C. Jordan.

Figure 287.—RETAINED ROOTS. (See Figure 272)

The roots of the second molar have been left behind and are elevated by alveolar absorption and absence of bite.

Dr A. C. Jordan.

Figure 288.—RETAINED ROOTS. (See Figure 274)

A male of 34.

A fragment of the first premolar tooth is seen surrounded by pericementitis.

The bridge work appears very satisfactory—root fillings extend to apices and there is no rarefaction of bone.

Dr A. C. Jordan.

Figure 289.—RETAINED ROOTS. (See Figure 274)

A male of 41.

The root of the second premolar has been left behind—there is some alveolar absorption.

Dr A. C. Jordan.

Figures 290 and 291.—UNERUPTED TOOTH. (See Figure 274)

A female of 33.

A misplaced canine is seen lying almost parallel to the alveolus. Its presence was unsuspected. A deciduous canine has been retained.

Dr A. C. Jordan.

Figure 291A.—UNERUPTED WISDOM TOOTH. (See Figure 272)

A male of 48.

A wisdom tooth is seen within a cystic cavity in the jaw, it possesses no roots.

Dr A. C. Jordan.

FIGURE 285

FIGURE 286

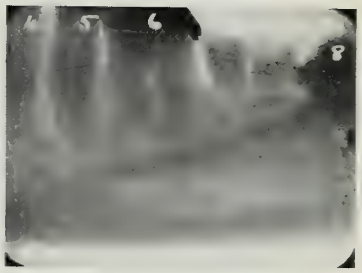


FIGURE 287

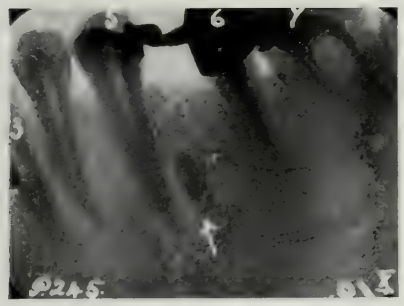


FIGURE 288

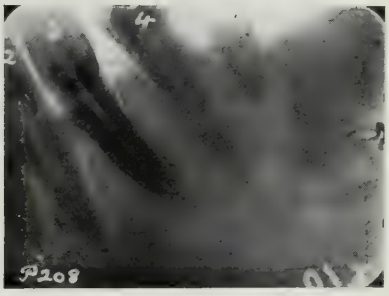


FIGURE 289

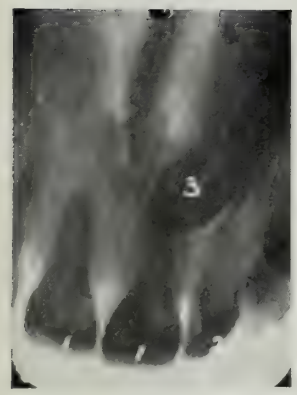


FIGURE 290

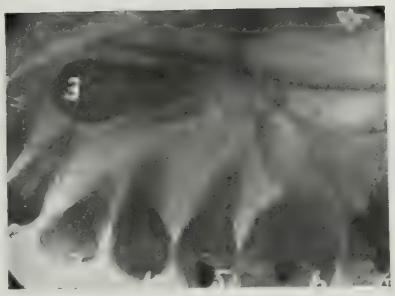


FIGURE 291

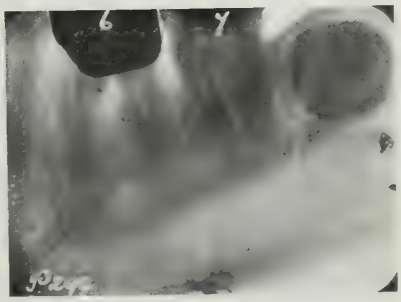


FIGURE 291A

Figure 291B.—DENTIGEROUS CYST. (See Figure 271)

Clinical History.—A large disfiguring swelling had developed over the right lower jaw of a boy aged 11. It had a papyraceous feel and was slightly painful.

Radiogram.—A cyst occupied the mandible in the neighbourhood of its angle. Embedded in its lowest part is a fangless tooth.

Operation.—The cavity was opened from the mouth and the tooth removed. After scraping out the cyst wall it was packed. A complete cure ensued.

Dr W. J. S. Bythell. Sir Wm. Milligan.
Dr A. E. Barclay.

FIGURE 291B

FOREIGN BODIES

Figure 292.—HALFPENNY IN ŒSOPHAGUS

Silhouette Radiogram.—A coin is clearly manifest at the commencement of the œsophagus. It caused dysphagia and some dyspnœa. It was successfully removed.

Mr W. Bain.

Figure 293.—SHOT IN FOREARM

Clinical History.—A gamekeeper aged 47 was hit in the forearm. The arm was extensively lacerated, and much skin lost. Healing took place by granulation, but only after numerous sequestra had been shed.

Silhouette Radiogram.—Note the general "peppering" of the forearm. The radius was shattered about the middle.

Mr E. R. Flint.

Figures 294 and 295.—NEEDLE IN THUMB

Silhouette Radiogram.—In all cases two positions must be screened, or, better still, a stereoscope used.

Figures 296 and 297.—NEEDLE IN FINGER

Silhouette Radiogram.—Two positions are shown, as in Figures 294 and 295. Note how the addition of the silhouette indicates the depth of the foreign body from the surface.

Figures 292-297 from *A Descriptive Atlas of Radiographs of the Bones and Joints*, by A. P. Bertwistle (John Wright & Sons, Bristol).

FIGURES 292–297

THYROID SYSTEM

Figure 298.—BRANCHIAL SINUS

A boy of 17. There was a depressed sinus between the two heads of the sternomastoid, about one inch above the clavicle, which had discharged from birth, and more so when he had coryza. A probe showed the sinus to be quite superficial to the sternomastoid as far as the angle of the jaw, where it passed deeply inwards. Large supratonsillar fossæ were present on each side, but no communication was made outwith the sinus.

Silhouette Radiogram. A probe has been passed into the sinus, and the patient radiographed. Note the external opening, and the termination.

Operation.—A probe was passed into the sinus and an incision made on to it. The sinus, thus revealed, was like a stout vein. It passed obliquely round the anterior border of the sternomastoid, and was dissected upwards to a point $\frac{3}{4}$ in. above the angle of the jaw, where it apparently ended. It had no relation with the carotid arteries.

The sinus measured $3\frac{7}{8}$ in. long, and $\frac{1}{4}$ in. in diameter. Above, the wall of the sinus was thick and studded with lymphoid nodules. There was suggestion of a diverticulum.

Microscopically, the lining consisted in its upper part of columnar epithelium with much lymphoid material: below, squamous epithelium formed the lining.

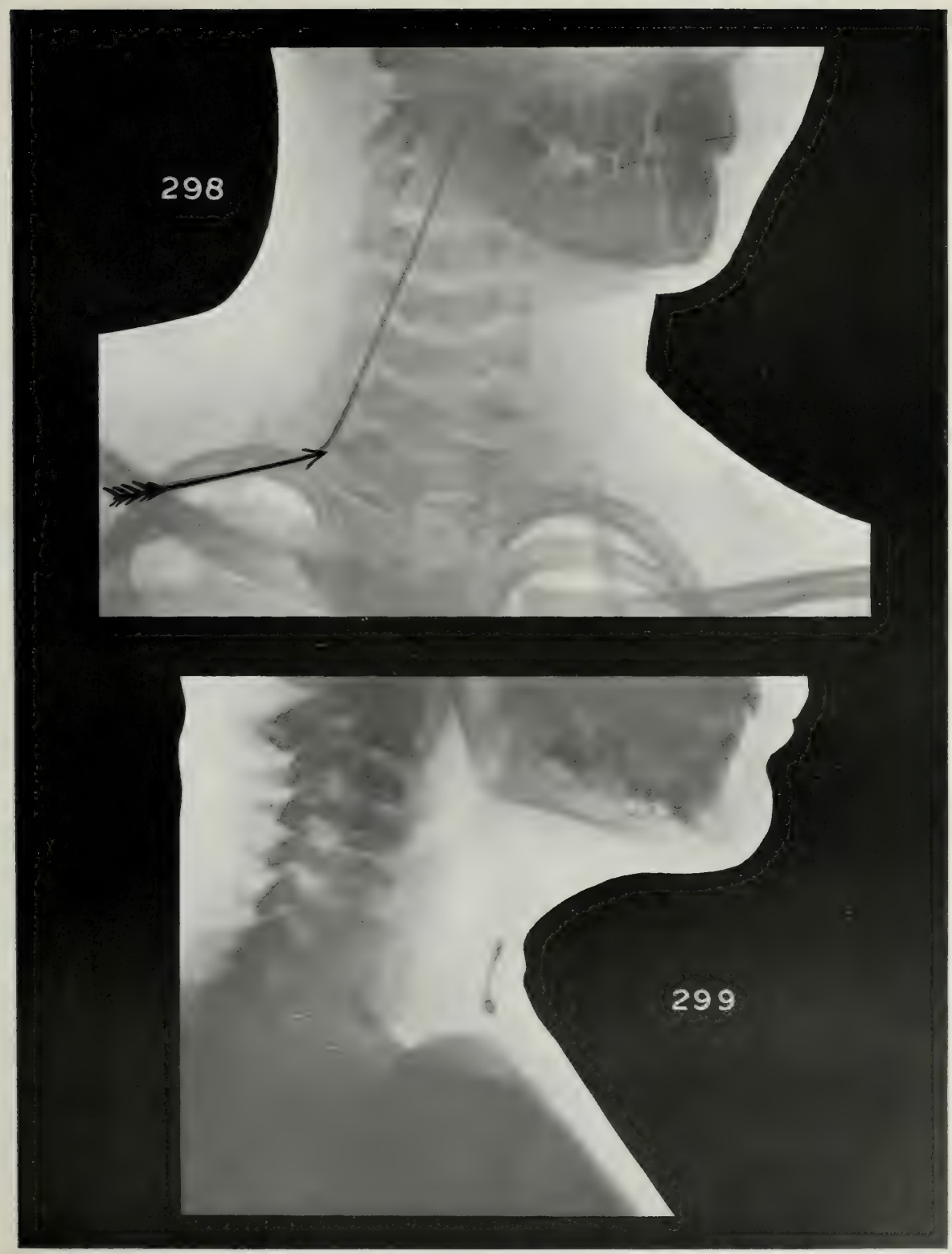
Figure 299.—THYROGLOSSAL SINUS

Occurred in a boy aged 7. The sinus was first noticed when he was eighteen months old, and has since remained stationary. At times a swelling appeared, and then he had pain during mastication: otherwise there was no inconvenience except a thin discharge, occasionally replaced by a sticky yellow fluid. A sinus was present in the midline of the neck surrounded by cicatrices. It moved on deglutition, and was palpable as a firm cord attached to the hyoid bone.

"Bipp" has been introduced into the sinus by means of a large-bore syringe. The opaque material is seen passing up towards the hyoid bone. Another attempt at filling the sinus succeeded in locating it just below and in front of the hyoid bone which was just visible.

Operation.—The sinus was found to end in a fibrous cord, which passed into the median raphe above and in front of the hyoid bone.

Figures 298 and 299 from *A Descriptive Atlas of Radiographs of the Bones and Joints*, by A. P. Bertwistle (John Wright & Sons, Bristol).



FIGURES 298 AND 299

Figure 300.—BRANCHIAL SINUS

Radiogram. Bismuth paste has been injected into the sinus. Same case as Figure 298.—*An X-ray Atlas of the Normal and Abnormal Structures of the Body*, by A. M'Kendrick and C. R. Whittaker.

Figure 301.—THYROGLOSSAL SINUS

Clinical History. A woman aged 28 was admitted with a small translucent nodule in the neck, exuding a thin serous fluid. She states this secretion was increased during mastication. According to her account, it had existed about six years, during which time it had occasionally ceased discharging. A swelling then appeared. This burst, and the immediate discharge was a thick, yellow fluid. On puncturing for injection purposes a honey-like fluid escaped.

Silhouette Radiogram.—Note pear-shaped bead of bismuth.

Operation.—A transverse incision was made, and the sinus, which ended above in a fibrous cord, was dissected out from the deep tissues between the hyoid bone and thyroid cartilage, and the wound closed. Healing was delayed, but six months later there had been no return. A slight keloid was present.

Microscopic Examination. An open tract runs along the length of this specimen, lined by very vascular and thick granulation tissue. No epithelial lining cells are to be seen anywhere. A fairly thick mass of thyroid tissue, with well-developed vesicles, extends along the whole length of the tract, but only along one side of it (? which side). Every stage of formation of the vesicles is to be found in the sections of this aspect of the tract.

Figure 302.—THYROGLOSSAL CYST

Clinical History.—A woman aged 29. The swelling of the neck which had existed for some time had lately increased in size, and become tender, interfering somewhat with mastication.

Silhouette Radiogram.—Note prominence in neck due to cyst.

Operation.—A transverse incision was made along the line of the natural crease in the neck. The cyst was freed as much as possible, not, however, without the contents escaping. The fluid in the cyst resembled pus: some was collected for chemical examination, and found to contain iodine. The whole of the cyst wall was carefully removed, and the wound closed by intradermal suture. There was no return of the cyst after four months.

Microscopic Examination.—One slide. A section showing thick granulation tissue round what may have been a sinus or cavity; outside this are bands and bundles of fibrous tissue, with material of embryonic type between the bundles. A tendency to formation of thyroid structures is found here, with some groups of definite and fair-sized vesicles.

Figure 303.—THYROGLOSSAL CYST

Clinical History.—A boy aged 2. A small superficial cyst was present between the thyroid cartilage and hyoid bone. It was noticed three months ago.

Operation.—A transverse incision was made and the cyst removed. It was adherent above to the thyroid cartilage. There was no return in three months, and no keloid had developed.

Figures 301-303 from "Facts and Considerations in the Study of the Thyroglossal Tract," by A. P. Bertwistle and J. E. Frazer.—*Brit. Jour. Surg.*, vol. xii., No. 47.

FIGURE 300

FIGURE 301

FIGURE 302

FIGURE 303

Figure 304. SUBSTERNAL GOITRE. (See Figure 185)

Clinical History.—A woman of 58 suffered from spasmodic cough and attacks of choking for which the uvula had been removed four years ago without improvement.

Radiogram.—Behind the sterno-clavicular joint on both sides is seen a shadow whose outline on the right side is particularly well defined.

Remarks.—The choking was undoubtedly due to compression of the trachea between the sternum and vertebral column by the goitre.

***N.B.*—Same case as Figure 127.**

Mr O. A. Marxer. Dr E. I. Spriggs.

Figure 305.—ADENOMA THYROID

Radiogram.—An oval shadow is seen opposite the fifth cervical vertebra.

Remarks.—Calcification is prone to occur in adenomas after hæmorrhage.

Dr L. A. Rowden.

FIGURE 304

FIGURE 305

NASAL SYSTEM

FIGURE 306

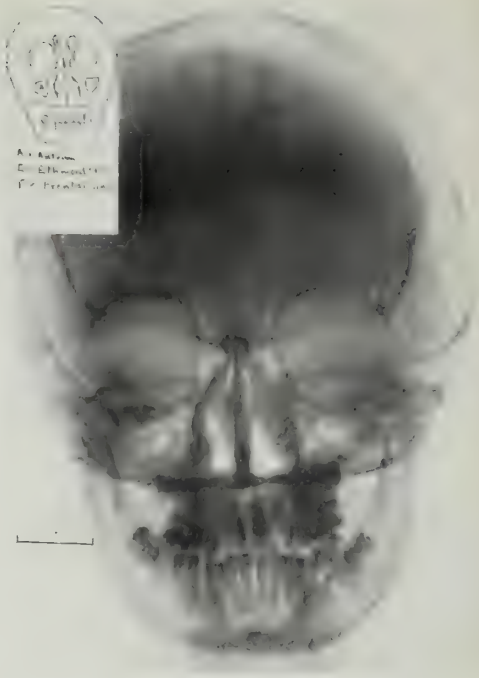


FIGURE 307

FIGURE 308

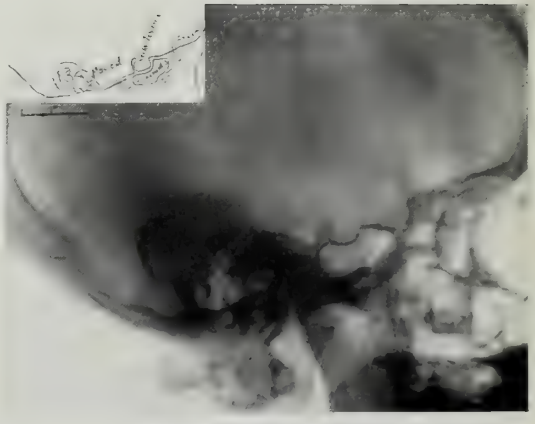


FIGURE 309

Figure 306.—NORMAL FRONTAL SINUS

A male of 50.

Radiogram shows very clearly the size and configuration of both sinuses, with septum between.

Mr C. Thurstan Holland. Sir Wm. Milligan.

Figure 307.—NORMAL ANTRUM

A boy of 15.

Radiogram (Postero-Anterior).—Normal appearance of antrum is seen.

Dr W. H. Rowden.

Figure 308.—NORMAL ANTRA

Radiogram (Superior-Inferior).—The antra are well seen.

Dr W. H. Rowden.

Figure 309.—NORMAL SPHENOIDAL SINUS

A man of 45.

Radiogram (Lateral).—The sphenoidal sinus is clearly visible below and in front of the sella turcica. The mastoid cells are well seen.

Dr W. H. Rowden.

Figure 310.—FRONTAL SINUSITIS. (See Figure 306)

Radiogram (Postero-Anterior view, 25° to base-line).—Marked obscurity of both frontal sinuses—the right being the denser. The maxillary antra are clear.

A lateral view showed both sinuses to be well developed, indicating that the obscurity is pathological.

Dr J. M. W. Morison. Sir Wm. Milligan.

Figure 311. LEFT FRONTAL SINUSITIS. (See Figure 306)

Clinical History.—A male, aged 19, complained of intermittent attacks of severe frontal headache which came on in the morning and were accompanied by unilateral purulent discharge. Pressure over the sinus elicited pain.

Transillumination.—The left sinus was quite opaque and the right slightly so.

Radiogram.—Shows complete disappearance of the frontal air cells of the left side and some change on the right.

Operation.—An incision was made over the sinus and its cavity obliterated. Recovery with some deformity ensued.

Dr W. J. S. Bythell. Sir Wm. Milligan.
Dr A. L. Barclay.

Figure 312.—ANTRUM (SUPPURATION). (See Figure 307)

Radiogram (Superior-Inferior).—The right antrum is relatively opaque compared with the left, its contents being fluid.

Dr L. A. Rowden.

Figure 313.—ANTRUM (SUPPURATION). (See Figure 307)

Clinical History.—A woman, aged 56, had an empyema of the antrum ten years ago when drainage was instituted. Since then she had a "clogged-up" feeling, accompanied by pain at the back of the head and neck.

Radiogram (Superior-Inferior).—Instead of radiolucency both antra present a hazy appearance.

Dr W. H. Rowden.

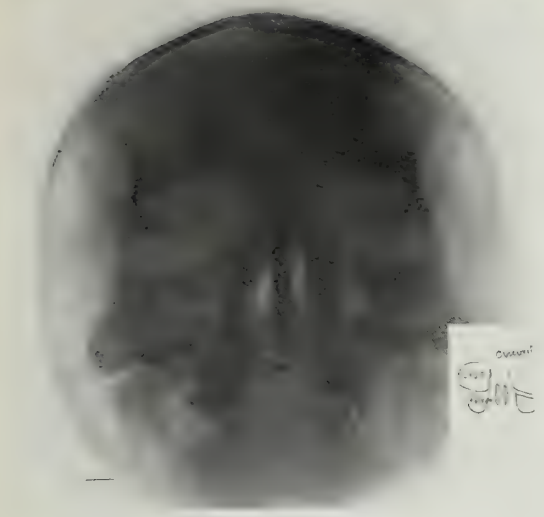


FIGURE 310

FIGURE 311

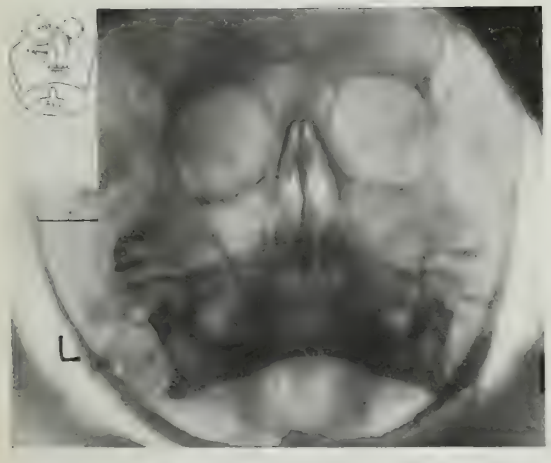


FIGURE 312

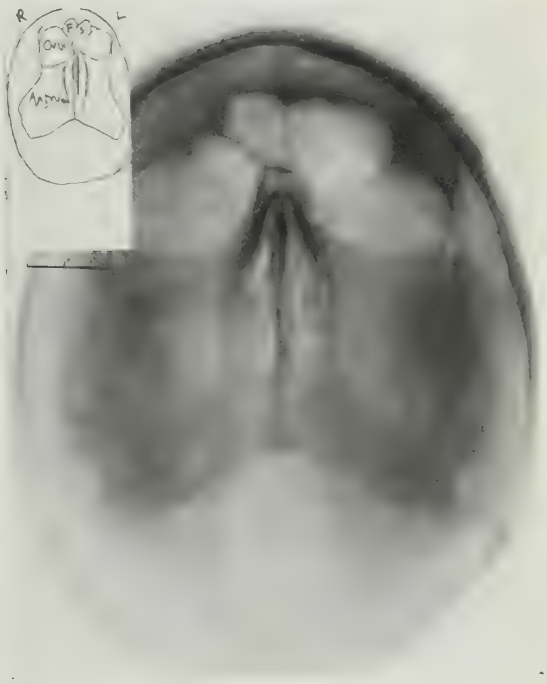


FIGURE 313

Figure 314. ETHMOIDAL SINUSITIS. (See Figure 307)

Clinical History.—A man had suffered from a nasal discharge for some time.

Radiogram.—The right antrum and ethmoidal sinuses are dense compared with those of the left side. There is a sequestrum in the ethmoid bone.

Dr W. H. Rowden.

Figure 315. ANTRUM (SUPPURATION). (See Figure 308)

Clinical History.—A man, aged 45, had a five years' history of nasal discharge.

Radiogram.—Diminished radiolucency is noted in the case of the right antrum.

Dr W. H. Rowden.

Figure 316.—SARCOMA OF MAXILLA. (See Figure 308)

Clinical History.—A woman aged 60 had symptoms of growth in the nose for four months.

Radiogram.—The right antrum is absolutely opaque. There is obliteration of the bony detail of the right maxilla and walls of the orbit and nose.

Dr W. H. Rowden.

Figure 317.—TUMOUR OF LEFT ORBIT. (See Figure 307)

Clinical History.—A girl aged 15 had a history of proptosis and sudden loss of vision three years ago; since then the condition has been stationary.

Radiogram (Postero-Anterior).—Uniform enlargement of the orbital cavity is shown. That the tumour arises from the soft parts is shown by the preservation of the bony detail.

Dr W. H. Rowden.

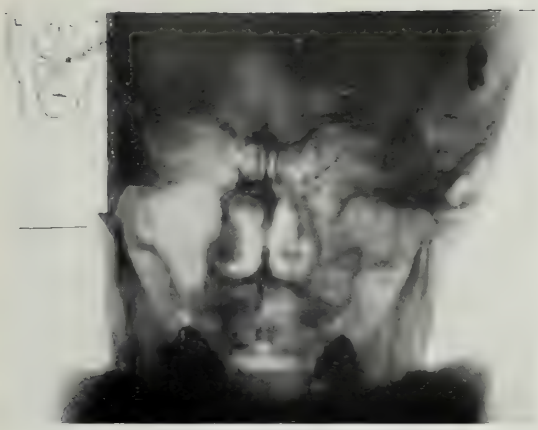


FIGURE 314

FIGURE 315

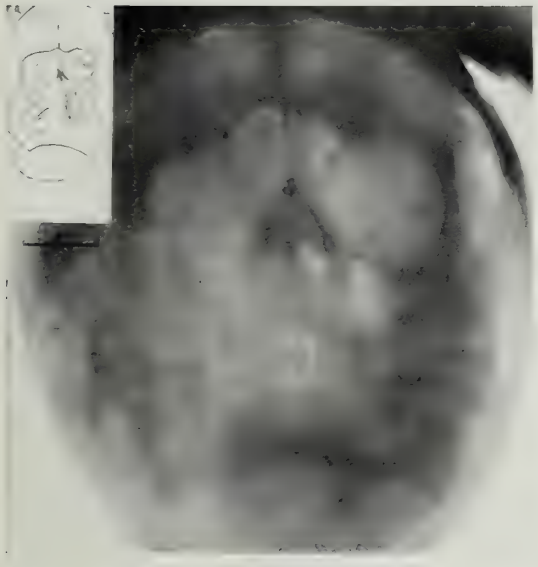


FIGURE 316

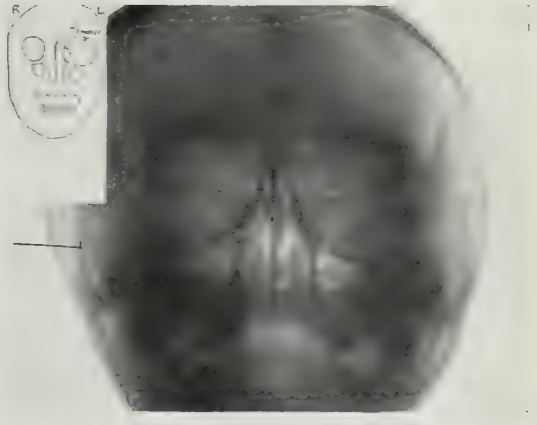


FIGURE 317

MISCELLANEOUS

Figure 318.—NÆVUS OF CHEST

A large mass is apparent, filling up the right axilla and extending as far as the ninth rib. The mass showed dilated veins: it was markedly expansile with respiration, coughing, and struggling. Areas of resonance were present. The signs somewhat resembled those of a hernia of the lung, but the presence of normal ribs excluded that diagnosis.

The tumour has somewhat separated the humerus from the glenoid cavity.

Mr H. Collinson.

Figure 319.—PHARYNGEAL DIVERTICULUM

The pouch, which is to the left of the middle-line, has been filled by swallowing a barium meal. It is seen to extend behind the sternum. The pressure of the filled sac between the sternum and the vertebral column causes dysphagia.

Sir Berkeley Moynihan, Bart.

Figures 318 and 319 from *A Descriptive Atlas of Radiographs of the Bones and Joints*, by A. P. Bertwistle (John Wright & Sons, Bristol).

FIGURES 318 AND 319

FEMALE GENERATIVE SYSTEM

Figure 320.—FIBROMYOMA OF UTERUS

Clinical History.—A woman aged 48 complained of vague abdominal pain. She suffered from constipation and menorrhagia.

Screen.—The small intestine was matted together and several calcareous glands were seen. There was much enlargement of the uterus.

Radiogram.—The stomach and duodenum appear normal. The intestinal coils appear as a dense mass kept out of the pelvis by what proved to be the uterus.

Operation.—The uterus was found to be the seat of a large fibromyoma.

Dr W. H. Rowden.

Figure 321.—CALCIFIED FIBROID OF UTERUS

Radiogram.—A large mottled shadow is seen in the pelvis cast by a calcified fibromyoma.

Remarks.—As with the thyroid, hæmorrhage is the predisposing factor in calcification.

Dr L. A. Rowden.

Figure 322.—OVARIAN CYST

Clinical History.—The nurse complained of vague abdominal pains.

Radiogram.—Two teeth are clearly seen lying in the hollow of the sacrum. Such are frequently found in the germinal spot of ovarian dermoids. The fact that muscles and glands may be present indicates their teratomatous nature.

Operation.—A dermoid cyst was found, it had become twisted on its pedicle and showed some degree of adhesive peritonitis.

Dr L. S. Debenham.

Figure 323.—FŒTUS IN UTERO—$7\frac{1}{2}$ MONTHS

Radiogram.—A child's head has entered the true pelvis. The body of the uterus reaches as high as the first lumbar disc.

Dr L. A. Rowden.

FIGURE 320

FIGURE 321

FIGURE 322

FIGURE 323

Figure 324.—FŒTUS IN UTERO—8 MONTHS

Clinical History.—A primipara, aged 25, in falling down a flight of stairs, dislocated her symphysis pubis. The child was born apparently full term a fortnight later, it was an easy labour and the child was perfectly healthy. Three months after her accident she was suffering no ill effects from her injury.

Dr G. F. Stebbing. Sir Charters Symonds.

Figure 325.—FŒTUS IN UTERO

Radiogram.—Shows a fœtus of six months.

Dr L. A. Rowden.

Figures 326 and 327.—OVARIAN PREGNANCY

Clinical History.—A primipara of 33 complained of great discomfort and swelling. The abdomen presented the appearance of a normal pregnancy of about eight-and-a-half-months gestation. Neither by abdominal or vaginal palpation could the presenting part be ascertained, even under anæsthesia, so the patient was referred to X-ray department.

Radiograms.—Figure 326.—A fully developed fœtus is seen whose lie and attitude are very irregular. The head is acutely flexed on the chest, the cervical spine projecting underneath the abdominal wall. The head was outside the pelvis and refused to engage.

Figure 327 (Lateral).—The fœtus is lying much more vertical than usual.

Operation.—As the result of X-ray findings Cæsarean section was performed and a full-term ovarian pregnancy disclosed. The uterus was in the pelvis, slightly enlarged. The right fallopian tube was flattened and stretched over the gestation sac. The tissue of the right ovary was thinned out and constituted the outer layer of the sac, which lay beyond the broad ligament. A full-time male child of $7\frac{1}{2}$ lb. (lying in blood-stained liquor amnii) was extracted; its skin was soft and somewhat macerated, death having occurred probably two weeks previously. The gestation sac and tube were removed, and the patient made an excellent recovery.

Dr T. I. Candy. Mr L. E. Acomb.

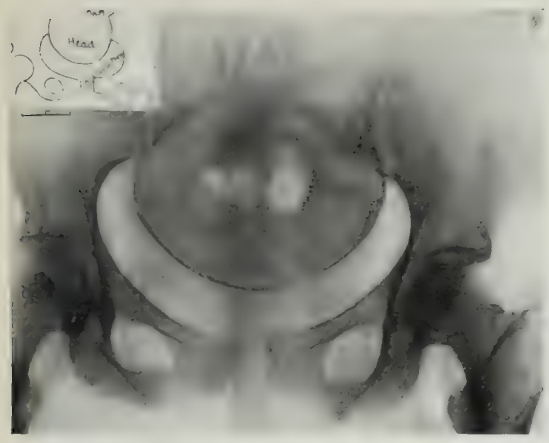


FIGURE 324

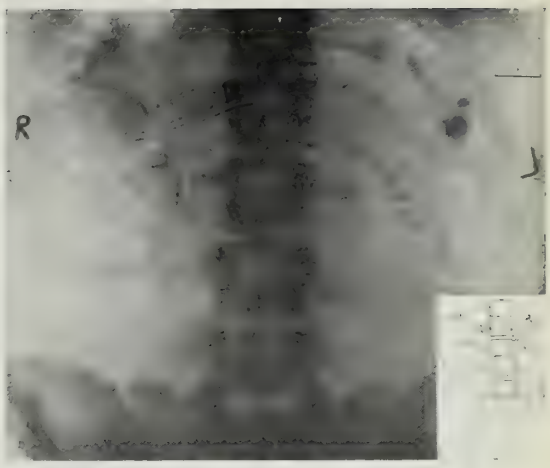


FIGURE 325

FIGURE 326

FIGURE 327

INDEX

A

Abnormal arteries, 11, 120, 122
Abscess, subphrenic, 14, 70
  Tooth, 210, 212
Accessory renal arteries, 11, 120, 122
Adenoma thyroid, 21, 226
  Uterus, 242
Alimentary system, 1-8, 24-101
Aneurism, 19, 200, 202
Angiofibroma, 190
Angular gyrus, 18
Antrum, normal, 231
  Suppuration of, 232, 234
Aorta, 19, 200, 202
Appendicitis, 6, 80, 82
Appendix, foreign bodies in, 6, 80
  Normal, 31
Arteries, 19, 200-204
  Abnormal, 11, 120, 122
  Calcification of, 204
  Rupture of, 204

B

Base-Line, 16, 185
"Bay," 2
Bile pigments, 5, 66
Bladder, calculus of, 11, 132, 134
  Carcinoma of, 12, 136
Bridge work, 210
Bronchial tree, 151
Bronchiectasis, 160
Broncho-pneumonia, 13
"Bucket handle," 168

C

Cæcum, carcinoma of, 88
  Inverted, 33
  Normal, 31
Cæsarean section, 244
Calcification of adenoma, 226, 242
  Costal cartilages, 54, 74, 100
  Glands, 109
  Transverse processes, 10
Calculus, bladder, 11, 132, 134
  Gall-bladder, 5, 29, 72-76
  Penile, 138, 142
  Pigment, 5
  Prostate, 11, 138, 140
  Renal, 10, 96, 112-118
  Salivary, 1, 36
  Urethral, 11, 138, 142
  Uretral, 10, 120, 128, 130
  Vesical, 11, 132, 134
Carcinoma of bladder, 12, 136
  Cæcum, 88
  Cardia, 52, 54
  Colon, 7, 88-92
  Lung, 13, 170, 174, 176
  Œsophagus, 2, 38, 40
  Prostate, 88
  Rectum, 88
  Sigmoid, 86, 90, 92
  Stomach, 34, 50-56
Carcinomatosis, 3, 13
Castellani spirochætosis, 164
Catherisation ureter, 107, 109, 120, 126, 130
Cavitation, 13, 48, 158
Cerebral topography, 15-18
Cerebro-spinal fluid, 18
Charcot-Leyden crystals, 84
Chiene's lines, 15
Cholesterin, 5, 76
Clinical cerebral topography, 15-18
Coin in sigmoid, 111
Colic, biliary, 5
  Renal, 10
Colon, carcinoma, 86, 92
  Diverticula, 94, 96
  Normal, 31, 33
Common bile duct, 6
Conclusive signs of pregnancy, 22
Concretion, appendicular, 80, 82
  Intestinal, 111
Congenital pyloric stenosis, 4, 58
Constant, 17, 187, 188
"Crab claw," 52
Craniectomy, 15, 17, 188
Crown work, 212
"Cup and spill," 48
Curtis belt, 100

Cyst, dentigerous, 214
Dermoid, 176
Hydatid, 178
Ovarian, 242
Pancreatic, 56
Thyroglossal, 224
Cystic duct, stone in, 5, 74
Cystine, 10
Cystogram, 9, 12, 105
Cystoscope, 11, 124, 130

D

"Datestone," 10, 130
Dental system, 208-215
Dentigerous cyst, 214
Dermoid cyst, 22, 176, 242
Dextracardia, 170
Diaphragmatic hernia, 7, 98
Dietl's crises, 11, 122
Dilatation stomach, 40
Distension of jejunum, 70
Diverticulitis, 7, 94
Diverticulum, bladder, 12, 140
Colon, 7, 88, 94, 96
Duodenum, 4, 72
Pharynx, 1, 34, 238
Double kidney, 122
Duodenal cap, 4, 48, 52, 56-62
Duodenal diverticulum, 4, 72
Ileus, 5, 72, 100
Ulcer, 4, 60-70
Ulcer, operation for, 66-70
Dyspepsia, flatulent, 7, 70, etc.

E

Effusion, pleural, 14, 156, 158
Emphysema, 13
Empyema, 14, 162
Endothelioma, 170
Encephalocele, 196

F

Faceted stones, 76
Fibroadenoma, 21, 242
Flatulent dyspepsia, 7, 70
"Fleck," 2, 5, 44, 60, 62
Fœtus *in utero*, 22, 242, 244
Foreign bodies, 1, 2, 11, 36, 80, 111, 142, 170, 218
Fossa navicularis, 11, 142
Frontal sinus, normal, 231
Frontal sinusitis, 232

G

Gall-bladder, 5, 74, 78
Gall-stones, 5, 29, 64, 72-76
Gastrectomy (*Frontispiece*), 5
Gastric carcinoma, 3, 50-56
Gastric ulcer, 2, 3, 42-48
Gastrocolic fistula, 3, 70
Gastroenterostomy, 5, 62-72
Gastrogastrostomy, 48
Gastroptosis, 100
Goitre, adenoma of, 205
Substernal, 228
Grahame Method, 78
"Ground-glass" appearance, 160
Gyrometer, 16, 187, 188

H

Halfpenny in œsophagus, 218
"Half shadow," 6, 64
Haustration, 7, 33, 84, 90
Heart, 19, 200
Hemiparesis, diaphragm, 156, 176
Hernia, diaphragm, 7, 98
Hodgkin's disease, 14, 172
Hunger pain, 4, 60-72
Hydatid cyst, 178
Hydronephrosis, 9, 11, 120, 122

I

Ileus, duodenal, 5, 72, 100
Incisura, 44, 54
Ischial spine, 10

J

Jaundice, 6, 80
Jejunum obstruction, 70
Jejunum, ulcer of, 5, 70

K

Key Radiogram, 183-188
Kidney, calculus of, 10, 112-120
Hydronephrosis of, 11, 120, 122
Movable, 11, 122
Tuberculous, 12, 118, 126
Killian's tube, 36
Kinks, appendix, 6, 80
Uretral, 11, 122

L

"Leather-Bottle" stomach, 3, 56
Lenhartz diet, 46
Lipoidal injection, 191, 193

Lungs, 13, 14, 147-178
Luschka, foramen of, 192
Lymphadenoma, 172

M

Majendi, foramen of, 192
Mass peristalsis, 33
Mediastinitis, 170
Mediastinum, 14
  Lymphosarcoma, 172
Membranous urethra, 11, 138, 142
Meningitis, 192
Miliary tubercle, 13
Mosaic calculi, 6, 76
Movable kidney, 11, 122, 124

N

Nævus of chest, 238
Napoleon, bust of, 11
Nasal system, 20, 231-234
Natural pneumothorax, 158
Needle in thumb, 218
" New-moon " calculus, 6
Nervous system, 15-18, 182-196
Neuroglioma, 190
" Niche," 4
Normal appendix, 31
  Colon, 31, 33
  Cystogram, 105
  Intestine, 27
  Œsophagus, 25
  Pyelogram, 107, 109
  Stomach, 25-31
  Teeth, 209
  Theca, 190

O

Œsophageospasm, 36
Œsophagus, carcinoma of, 2, 38
  Diverticulum of, 1, 34, 238
  Fibrous stricture of, 1
  Halfpenny in, 218
  Normal, 25
Opercula of Reil, 18
Orbit, tumour of, 234
Osteoarthritis, 74
Ovarian cyst, 242
  Pregnancy, 244
Ovaries, 22, 56
Oxalates, 9, 76

P

Pancreatic cyst, 56
Penetration gastric ulcer, 3, 42
Penile calculus, 11, 142
Perforation duodenal ulcer, 70
Perforation gastric ulcer, 3, 42
Pericardial effusion, 14
Pharynx, diverticulum of, 1, 34, 238
Phleboliths, 10, 109, 111, 140
Phosphates, 9, 132, 134
Phrenic nerve, evulsion of, 156
Pigment calculus, 5
Pin in prostate, 181
Pleura, 14
Pleural effusion, 14, 156, 158
Plummer's bag, 36
Pneumonia, 13, 162
Pneumothorax, 14, 156, 158, 164, 166
Pregnancy, 22, 242, 244
  Ovarian, 244
Prostatic calculi, 11, 138, 140
  Calculi, pin in, 142
Prostatic carcinoma, 88
Pyelogram, 9, 107, 109
Pylorus, 40-56
  Congenital stenosis of, 4, 58
  Obstruction of, 66
Pyopneumothorax, 156
Pyorrhœa Alveolaris, 210

R

Reil, operculum, Island of, 18
Renal calculus, 10, 76, 112-118
  Colic, 10
  Sand, 114, 116
  Tuberculosis, 12, 118, 126
Rolandic area, 18
" Roof tiling," 164
Roots, retained, 212

S

Salivary calculus, 1, 36
Sarcoma lung, 13, 170, 176
Sarcoma of maxilla, 234
Sarcomatosis, 13
Scale, watchspring, 16, 193
Sciatica, 192
Scoliosis, 156
Sequestrum, 20, 234
Septum transversum, 7
Shot in appendix, 80
Shot in arm, 218

Sigmoid, carcinoma of, 86-90
Sigmoidoscope, 86
Silhouette radiograms, 196, 204, 218-226, 238
Sinus, branchial, 222, 224
Frontal, 231
Sphenoidal, 231
Thyroglossal, 222, 224
Sinusitis, frontal, 232
Spasm, appendix, 6, 80, 82
Duodenum, 64
Gastric, 2
Sphenoidal sinus, 231
Spina bifida, 196
Spirochætosis Castellani, 205
Spondylitis deformans, 74, 78
Stenosis, congenital pyloric, 4, 58
Gastric, 3
"Stepped" duodenum, 28
Stomach, diseases of, 40-68
Normal, 25-29
Stricture, œsophagus, 38
Subdural space, 18
Subphrenic abscess, 14, 70
Substernal goitre, 14, 226
Superimposition cranial defects, 17, 187
Supramarginal gyrus, 18
Symphysis pubis, dislocation of, 242
Syphilis, 200, 202

T

Temporal convolution, 17
Tetrabromidophenalphthalein injection, 78
Tetraiodophenalphthalein, 78
Thoracoplasty, 168
Thyroglossal cysts, 21, 224
Sinus, 21, 222, 224
Thyroid adenoma, 21, 226
Cancer, 190
Substernal, 14, 21, 226
System, 222-226
Tibial arteries, 204
Topography, cerebral, 15-18
Tracheal "streak," 160
Transillumination, 232
Tuberculous abscess, 192
Kidney, 12, 118, 126
Lung, 152-158, 164-170
Transposition heart, 170
Transposition colon, 92
Tumours, cerebral, 17
Tumours, spinal, 190, 192
Typhoid fever, 72, 78

U

Ulcer, appendix, 80
Duodenal, 4, 60-70
Gastric, 42-48
Gastrocolic, 4, 70
Jejunal, 5, 70
Unerupted tooth, 212
Ureteric calculus, 11, 80, 120, 128, 130
Urethral calculus, 11, 138, 142
Uric acid, 9
Urinary system, 9-11, 104-142
Uterus, 22, 142

V

Valvulæ conniventæ, 29, 31, 70
Vascular system, 9, 200-204
Ventriculogram, 18, 194
Vesical calculus, 11, 132, 134
Carcinoma, 12, 136
Diverticulum, 140
"Vicious" bile circulation, 66
Visceroptosis, 8, 100
V-Resection, 46

W

"Waterspout," 48
"Wedding-ring" calculus, 6, 74, 76

X

Xanthin, 10

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